Spring 2014

Missouri S&T Magazine Spring 2014

Missouri S&T Marketing and Communications Department

Miner Alumni Association

MISSOURI S&T MAGAZINE

SPRING 2014 VOL. 88 NO. 1

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REDEFINING

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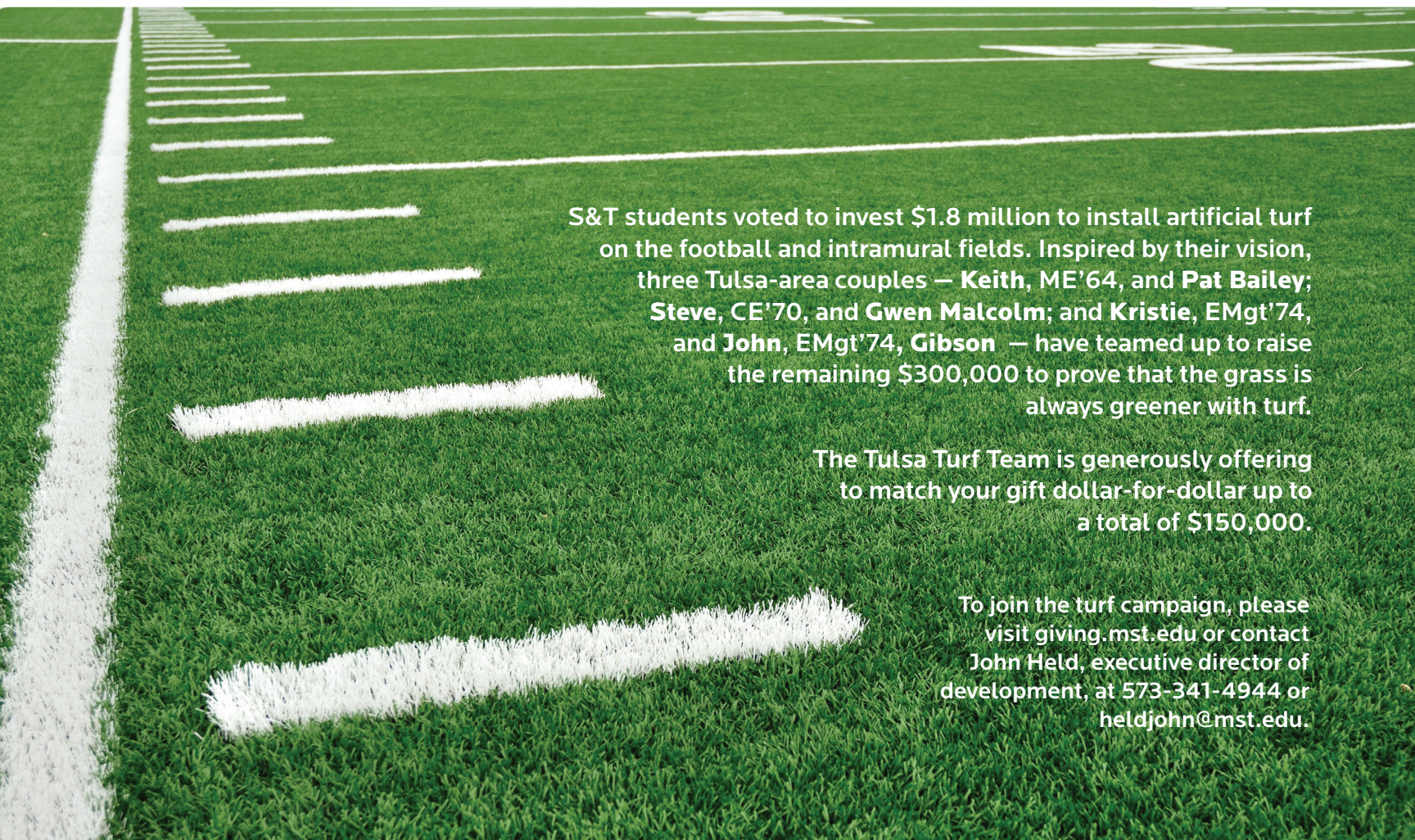
REDEFINING RESEARCH

SPRING 2014 VOL. 88 NO. 1

The grass is always **GREENER** (with turf)

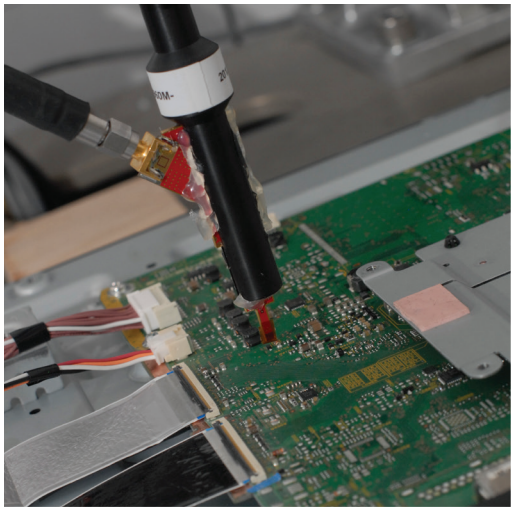
A turf-covered football field will help recruit student athletes, but because this project will also cover the intramural fields, it will benefit thousands of S&T students who aren't varsity athletes. Plus, turf lowers maintenance expenses.

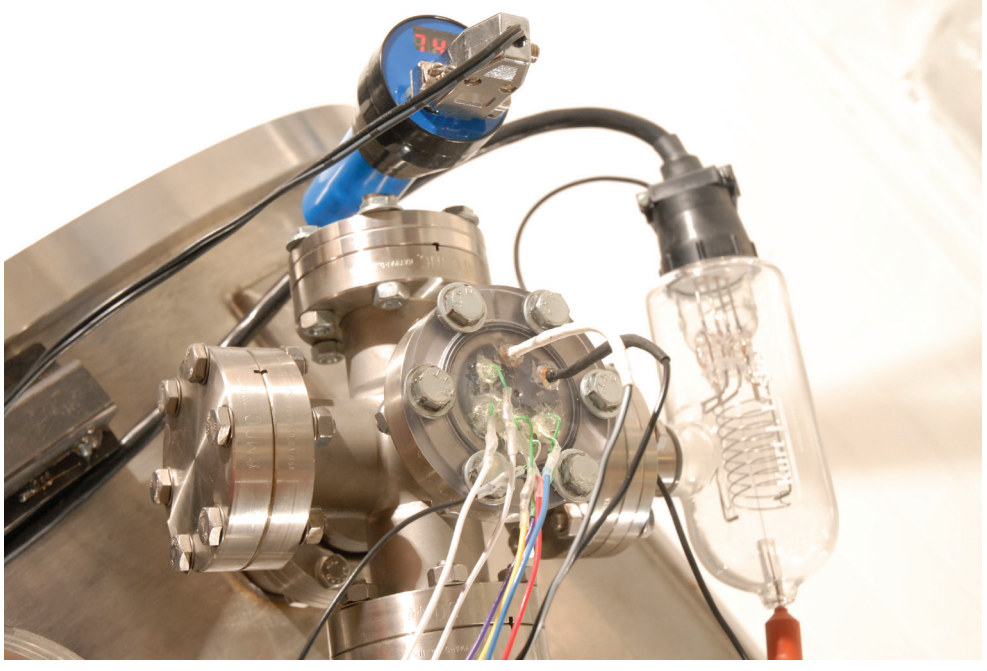


S&T students voted to invest $1.8 million to install artificial turf on the football and intramural fields. Inspired by their vision, three Tulsa-area couples — Keith, ME'64, and Pat Bailey; Steve, CE'70, and Gwen Malcolm; and Kristie, EMgt'74, and John, EMgt'74, Gibson — have teamed up to raise the remaining $300,000 to prove that the grass is always greener with turf.

The Tulsa Turf Team is generously offering to match your gift dollar-for-dollar up to a total of $150,000.

To join the turf campaign, please visit giving.mst.edu or contact John Held, executive director of development, at 573-341-4944 or heldjohn@mst.edu.





ON THE COVER

Flame-retardant jackets and safety glasses are a common sight in many Missouri S&T laboratories. The lightweight jackets protect students against sudden flame and sparks and are designed to self-extinguish. (Photo by B.A. Rupert).

1,240

Freshmen enrolled on the first day of the fall 2013 semester. They came from 31 states and six foreign countries.

Minority students enrolled during the fall 2013 semester, a new record.

881

6.2

Percentage increase in female enrollment over fall 2012 numbers. S&T enrolled a record 1,839 female students in fall 2013.

Percentage of S&T freshmen who receive scholarships and financial aid. The average assistance package is $13,757.

25

Percentage of S&T freshmen who are first-generation college students.

MISSOURI S&T MAGAZINE

***Missouri S&T Magazine* is written, edited and designed by the staff of the Missouri S&T Communications Department and the Miner Alumni Association.**

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The crossroads

Our campus has a proud tradition of equipping our students with a practical, applied education. It's a tradition that began with our founding as a land grant institution — a response to the westward expansion fueled by the Industrial Revolution.

Over the century that followed, Missouri S&T became a full-fledged research university, coming of age — as many research campuses did — during the height of the U.S.-Soviet "Space Race." Though research became more prominent on campus, the university remained true to its land-grant roots. Today, Missouri S&T continues to evolve, advancing the fields of engineering, science and technology. But it does so in the face of economic uncertainty.

This economic uncertainty means a shift in funding — which in turn redefines S&T's role as a research university. Last year, for the first time in its history, Missouri S&T received the majority of its research funding from private sources.

As the private sector looks to universities like Missouri S&T to solve real-world problems, we're also partnering with private interests to support our research goals. This shift allows S&T to continue to push the envelope of innovation. But it also raises questions: Who ultimately benefits from this research? And at what cost?

These are questions our cover story, "Redefining research," attempts to answer.

One thing is certain: The need for university research will not go away any time soon. It is what fueled innovation in the past — from the Space Race forward — and it will continue to fuel it in the future.

Megan Kean-O'Brien
MS TComm'12
design and production editor

CORRECTIONS

The picture that ran with the memorial for **Daniel K. Goodman**, EE'65, in the Summer 2013 and Fall/Winter 2013 issues was actually **Jack Goodman**, Phys'65, who lives in Cupertino, Calif. We regret the error. The memorial notice and correct picture of **Daniel K. Goodman** are on page 46 of this issue.

The picture that ran with the memorial for **Chris A. Wunnenberg Jr.**, ME'48, in the Fall/Winter 2013 issue was actually the late **Edward C. Wunnenberg**, ME'49. The correct memorial notice and photograph appear on page 43 of this issue. We regret the error.

{ EDITOR'S TOP FIVE PICKS }

1 } **Frank Liou** is developing computer models of various additive manufacturing approaches. Find out how on page 14.

2 } Junior **Hannah Frye** is working side by side with biological sciences chair **Robert Aronstam**, researching how muscarinic acetylcholine receptors react to different pharmaceuticals. She explains some of their findings on page 17.

3 } For the fourth time in school history, an S&T student-athlete was named Academic All-America of the Year. Find out who on page 16.

4 } It's competition time for many of S&T's design teams. Check out the schedule on page 31 to see which teams will be in your area and watch for updates at **rol.la/designteamdates**. Be sure to get out and support our students.

5 } Until the Hasselmann Alumni House is completed, a status report on its progress will run in every issue of the magazine. You can also watch the progress via web cam. See the back cover for details.

Q:

What was your hardest class at S&T?

Maybe it was beneficial and you use the knowledge you gained daily or maybe you're just glad you survived. Either way, we asked about your hardest class or your toughest professor. Here's what you told us:

A:

I still tell the story to this day of the impact that my freshman chemistry class had on my degree choice and career path. Not that freshman chemistry should be the hardest class at Rolla, but for me it was a bear. As a result of pulling out a C in the class, I sat back and contemplated my future and a commitment to a degree major. Like any intelligent 19-year-old would do, I made the decision based on which major required no more chemistry classes and more importantly, which major would keep me physically the farthest from the chemistry building. The answer became clear — the electrical engineering curriculum required no additional chemistry and the EE Building was the farthest away on campus (circa 1981). Best decision I ever made.

Craig M. Koenig, EE'86
Kansas City, Mo.

Definitely Philosophy. Only C of my campus career, and lucky to get that.

Tom Zenge, CE'69
Cincinnati

My hardest class was Physical Chemistry, taught in the chemical engineering department. On the first test of two, the only thing I got right was my name at the top of the paper, and after the test, I am not sure I got that right. I did manage to pass both semesters of the required course but would not want to go there again.

Charlie Campbell, MetE'64
Broken Arrow, Okla.

Organic Chemistry was a tough subject even for most chemical engineering students. Problem was our professor was focused on the organic structure of molecules that made dye. Few if any of us were ever going into the dye industry. So I felt it was a waste of my time and had the misfortune of voicing that opinion. Not a good move. A word to the wise: Go with the flow, it helps your grades. Just realize professors have their own bias. Bottom line is, I did get a good job and worked for the same company for 38 years, achieving a high level of management in a Fortune 500 company. All thanks to a poor boy being blessed with an education from what was then the Missouri School of Mines and Metallurgy.

Herbert Miller, ChE'57
Celina, Texas

My toughest class was Nuclear Physics in 1963. I just earned a grade high enough to graduate without repeating the class. There was a rumor going around that the physics department made the course extra tough just to create a national name for itself, who knows. I was happy to finish the class and graduate in January 1964. I only used my nuclear metallurgical training for a year after graduating and then changed fields and never looked back. That led to a very rewarding career and finally retirement, which I'm enjoying immensely in East Tennessee.

William Malone, MetE'64
Loudon, Tenn.

Watch for the next question in your Miner Alumni Association eNewsletter.

Email your answers to alumni@mst.edu, or via Facebook or Twitter, by Aug. 1, 2014.

*The article on **Ron Epps**, Phys'67, was of high interest to me as there were four students from Mount Vernon High School in two consecutive years who were physics majors at (then) UMR – Epps, **Nick Prater**, Phys'67, **Charles Steven Nichols**, Phys'68, and myself. This would seem to be exceptional as our high school classes were only about 70 students! We all graduated near the top of our classes at UMR — pretty good record for four country kids from a small high school in southwest Missouri. This was due in no small part to the mentoring we received from **Henle Holmes**, MS Tch Math'61, our physics and math instructor at Mount Vernon, and then the fine university leadership of Dr. **H.Q. Fuller** and Dr. **John T. Park**, who later became chancellor.*

I taught math and physics for 11 years and then worked 30-plus years in the oil service industry, retiring in April from Schlumberger as project manager in the area of exploration software development.

Eugene Aufdembrink, Phys'68, MS Phys'70
Needville, Texas

I earned my master's degree in December 1973 and we moved on to Montréal, Canada, for my doctorate. Now, 40 years after we left Rolla, I am writing from my hometown of Mersin, Turkey. My wife is a professor in Mersin University. I am director of a manufacturing company and our clientele includes Nooter/Eriksen Inc. It is always nice to find out that some of the people at Nooter were students at Rolla at the same time with me.

Looking back, I can say that we have spent some of our most pleasant days in Rolla and we remember them fondly. Thank you, Rolla. It has been a privilege and honor to be among your students and alumni.

(Mehmet) Nihat Taner, MS CE'73
Mersin, Turkey

Editor's note: Mr. Taner wrote a nostalgic note about his travels from Turkey to Rolla and his life since graduation. An update appears on page 36. Read the full note online at **magazine.mst.edu**.

I just received my Fall/Winter issue of Missouri S&T Magazine *and it reminded me of Prof. **Kent Peaslee**, who presented me with the Benjamin F. Fairless Award at AISTech 2013 in Pittsburgh on May 7, 2013. Prof. Peaslee was president of the Association for Iron and Steel Technology (AIST) and he presented the award at the President's Breakfast with more than 1,200 people in attendance. I have attached a photo of the presentation. Tragically, Prof. Peaslee suddenly passed away the following week. I thought that you may want to include the photo in an upcoming magazine.*

Bruce Bramfitt, MetE'60, MS MetE'62, PhD MetE'66, Steelton, Pa.

Tell us. Did you think of that?

We've all seen an invention that's made us stop and say, "Why didn't I think of that?" Help us find Rolla alumni who have demonstrated their ingenuity and innovation through their inventions. In an attempt to identify the diverse, distinguished and successful careers of our alumni, we are compiling a list of those who saw a need and created something new to meet that need.

We have already identified several patents owned by Rolla alumni, but we need your help to make this list more complete. If you know of alumni who have invented something, from the serious to the strange, please help us by completing this short online survey found at **rol.la/minerinventors**.

@STEMconnector
STEM Connector, Washington, D.C.

Dr. Cheryl B. Schrader of @MissouriSandT — named @IEEEorg Fellow! Via @RollaDailyNews. Congrats, @SandTChancellor!

@GLM1
Gail Myer, Branson, Mo.

You know your son is a @MissouriSandT student when he is on your team in Wit and Wagers and u crush the competition. Eng Education works!

@ozarkwriter
Martha Prine Edwards, St. James, Mo.

A great #MLKDay2014! Got to see @MissouriSandT students working at @yourpartnership Resale Shop & Newburg Children's Museum today! #awesome

@kaleykmac
Kaley McLain, CerE'12, Quad Cities, Iowa

Last night a mom stopped me at the movies b/c I was wearing a @MissouriSandT shirt to talk about why I chose S&T #ForeverAnAmbassador

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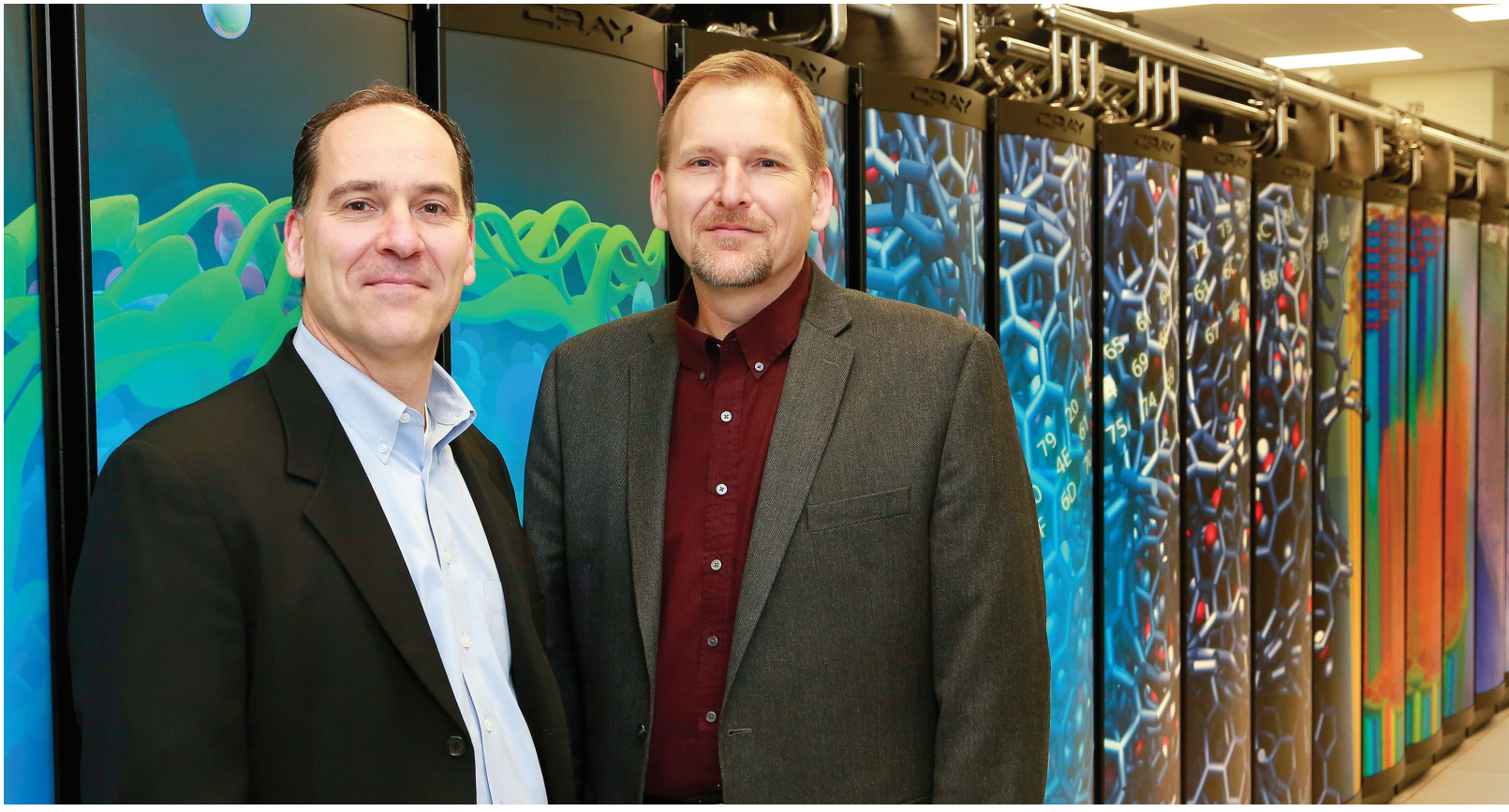


The Wagner brothers, John (left) and Robert, in front of one of the world's fastest supercomputers, Titan. (Photo by Jason Richards/ORNL)

OAK RIDGE BROTHERS: JOHN AND ROBERT WAGNER

For more than 14 years, brothers **John Wagner**, NucE'92, and **Robert Wagner**, ME'93, MS ME'95, PhD ME'99, have worked at Oak Ridge National Laboratory (ORNL), the Department of Energy's largest multi-program science and energy laboratory. ORNL owns a piece of history through its role in World War II's Manhattan Project. It is also home to Titan, one of the world's fastest supercomputers.

"We both worked at ORNL in separate departments as interns during our college years," explains Robert. "It was a bit of a surprise, actually, that we both ended up here. We hadn't really discussed it with each other. John was changing jobs and I was hired right after I graduated from S&T."

Older brother John is manager for Used Fuel Systems in ORNL's Reactor and Nuclear Systems Division and national technical director for the U.S. Department of Energy (DOE) Office of Nuclear Energy's Nuclear Fuels Storage and Transportation Program. He leads applied R&D activities related to the safe storage and transportation of spent nuclear fuel. Previously, he served as technical lead for nuclear criticality safety — a field of nuclear engineering that focuses on the prevention of nuclear accidents — for the Yucca Mountain nuclear waste repository project, which was terminated in 2010.

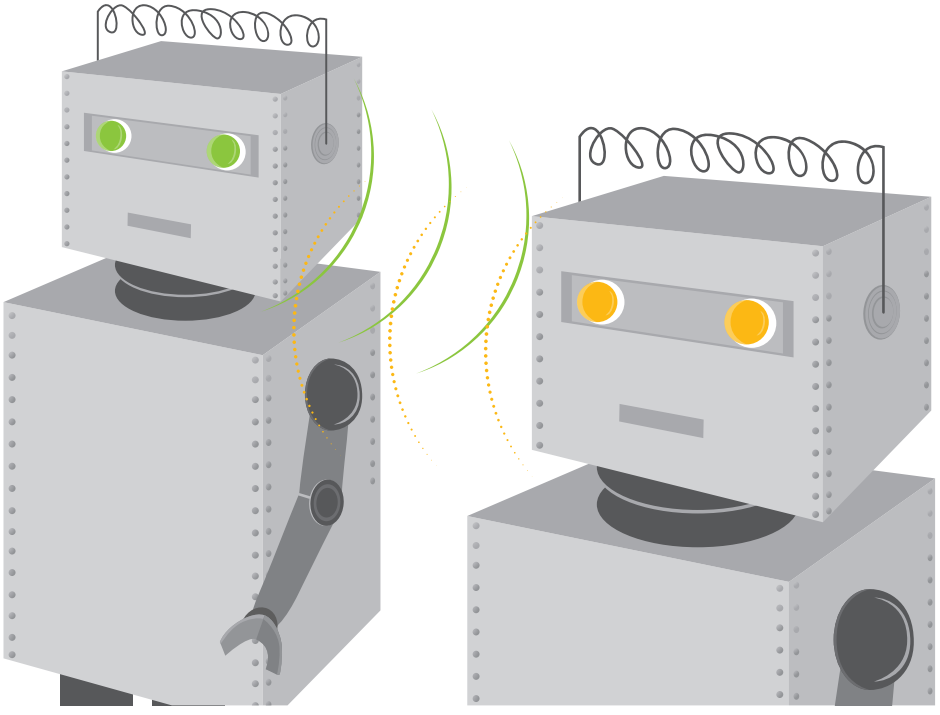
Robert directs the Fuels, Engines and Emissions Research Center at ORNL's National Transportation Research Center. He leads projects that examine low-temperature and unstable combustion and renewable fuel technologies. He also forms collaborations between ORNL, the DOE and external companies, like Ford and General Motors, to study high-performance engines and fuels by using supercomputing to solve the challenges of the future of transportation.

"We work to get you there faster," he says.

The brothers won the lab's Early Career Award for Engineering Accomplishment in back-to-back years. And though their technical areas don't overlap, they still find time for an occasional lunch date.

"Oak Ridge gives us access to a combination of resources and interdisciplinary research that is not available anywhere else," says John. There is a diversity and depth of expertise that makes this place unique." ■

ROBOTS WITH BRAINS?



In the future, groups of semi-autonomous robots could take over dangerous tasks currently handled by humans, such as decommissioning a land mine or rescuing victims of a building collapse, thanks to a new feedback system developed by ***Jagannathan Sarangapani****, the William A. Rutledge-Emerson Electric Co. Distinguished Professor of Electrical Engineering.*

The system, funded in part by the National Science Foundation, will allow a "follower" robot to take over as the "leader" robot if the original leader has a system or mechanical failure. The trajectory of the lead robot is set in advance and the followers trace the same pattern using sonar.

When a problem occurs with the lead robot, a type of feedback system known as a fault-tolerant control system uses reinforcement learning and active critique to help a follower robot to estimate its new course and become the new leader.

Sarangapani says his research can be applied to robotic security surveillance, mining and even aerial maneuvering.

"The end goal is to push robotics to the next level," says Sarangapani. "I want robots to think for themselves, to learn, adapt and use active critique to work unsupervised. A self-aware robot will eventually be here, it is just a matter of time." ■

U.S. NEWS RANKS S&T'S ONLINE **DEGREE PROGRAMS**

Fifteen online master's degree programs at Missouri S&T are ranked among the nation's best in three categories, according to *U.S. News & World Report*'s 2014 Best Online Programs Rankings.

S&T's online graduate computer information technology programs were tied for eighth overall and tied for fifth among public universities. S&T offers online graduate degrees in computer science and information science and technology.

S&T's online graduate engineering programs were tied for 17th place overall and ranked 13th among public universities. S&T offers online graduate degree programs in 12 disciplines: aerospace engineering, civil engineering, computer engineering, electrical engineering, engineering management, environmental engineering, explosives engineering, geotechnics, manufacturing engineering, mechanical engineering, mining engineering and systems engineering.

S&T's online graduate business programs were tied for 70th overall and ranked 50th among public universities. S&T offers an online MBA program.

S&T: A KIPLINGER'S **TOP VALUE**

Missouri S&T is one of the nation's top 100 public universities, according to Kiplinger's *Personal Finance*. Kiplinger's list of Best Values in Public Colleges, published in the magazine's February issue, ranks Missouri S&T 81st among public institutions that "combine outstanding education with economic value."

BRINGING CLEAN WATER TO HONDURAS

Students from S&T's chapter of Engineers Without Borders spent a week in Santiago, Honduras, in January to complete the installation of a water chlorination system that will help 6,000 people gain access to clean drinking water.

Last summer, the team installed a chlorine pump at one of the community's three wells as a pilot run for the use of chlorination in the community. It allowed the team to see if its solution was sustainable and acceptable for the people of Santiago.

Team members remotely monitored the system from Rolla during the fall semester by calling water operators in Honduras and contacting Santiago's mayor. They determined that the system had been properly maintained and that the community had no opposition to the newly chlorinated water.

To complete the system, the students helped the community install two more chlorination systems during the January trip. They then monitored the reduction in biological contamination in the chlorinated water supply.

Pictured above, **Andrea Miller**, a senior in computer engineering, and a member of the water committee review plans for a leak study of the existing water distribution system in Santiago, Honduras. To the right, **Cathryn Pherigo**, left, a junior in chemical engineering, and **Haley Witcher**, a sophomore in chemical engineering, traveled to Honduras with EWB in January.

A view of the destruction from 24th Street, between Kentucky and Grand streets in Joplin, Mo.

RECOVERING FROM DISASTER

Nearly three years after a major tornado destroyed much of Joplin, Mo., former Joplin resident **Suzanna Long** created a process to help communities recover quickly from large-scale natural disasters.

Long, Hist'84, Phys'84, MS EMgt'04, PhD EMgt'07, an assistant professor of engineering management and systems engineering, worked with the U.S. Geological Survey and the University of Puerto Rico at Mayaguez to develop the process. Her model takes into account critical infrastructure elements, such as sewer lines and power grids, along with geographical characteristics of the area, hazard damage and the time it took to restore the area, to create a comprehensive recovery approach. It is one of the first models to consider all of these elements.

To build the model, Long gathered data for Overland Park, Kan., which experiences tornadic activity at more than four times the national average. For the next phase of the study, Long plans to model the impact of an 8 or 9 magnitude earthquake along the New Madrid fault in southeast Missouri. ■

GOING GREEN CAN SAVE GREEN

The energy efficiencies of a solar house can result in significant energy savings and save homeowners money in the long run, says **Samantha Wermager**, a senior in civil engineering. Wermager performed an energy analysis of S&T's 2013 solar house with her advisor **Stuart Baur**, an associate professor of civil, architectural and environmental engineering. Their research was published in the Dec. 4, 2013, issue of the journal *Energies*.

Wermager used Energy-10 software, which gives feedback on energy performance and helps identify optimal approaches to energy efficiency. She says that using her results, along with an online solar-estimator calculator that helps determine the financial feasibility of installing renewable energy systems, will help homeowners interested in solar houses to see beyond the initial costs. ■

S&T TO LEAD TRANSPORTATION **CONSORTIUM**

Missouri S&T is leading a consortium of four universities that will share $1.4 million per year through a two-year grant authorized by Congress under the Moving Ahead for Progress in the 21st Century Act (MAP-21).

The funds will establish a new University Transportation Center, named RE-CAST (Research on Concrete Applications for Sustainable Transportation), that will study the use of new materials and structural systems to improve roads and bridges.

Kamal Khayat, the Vernon and Maralee Jones Chair of Civil Engineering and director of S&T's Center for Infrastructure Engineering Studies, is the principal investigator. Working with Khayat are **John J. Myers**, professor of civil, architectural and environmental engineering; **Dimitri Feys**, assistant professor of civil, architectural and environmental engineering; and Jeffrey Volz, associate professor of structural engineering at Oklahoma University.

IN **PRINT**

Aluminum Recycling (2nd Ed.) by **Mark E. Schlesinger**, professor of metallurgical engineering, was published in December by CRC Press.

Experimental Russian Verb Modification Dictionary, by **Irina V. Ivliyeva**, associate professor of Russian, was published in December by Azbukovnik Publishing House.

S&T OFFERS NEW **I/O PSYCHOLOGY MASTER'S DEGREE**

The Bureau of Labor Statistics predicts the need for industrial-organizational psychologists could grow by as much as 53 percent by 2018. To help meet that need, Missouri S&T is now offering a master of science degree in industrial-organizational psychology.

The program, which began in spring 2014, offers a thesis option or three non-thesis tracks in both the traditional classroom setting and online. Students can focus on leadership in technological organizations, psychometrics or human factors.

To learn more about the I/O psychology master's degree, visit **psych.mst.edu/graduate/indorgpsych**.

S&T NAMED TO NATIONAL **ACADEMY OF INVENTORS**

In October 2013, Missouri S&T became a charter member of the National Academy of Inventors (NAI), an organization that promotes research and innovation among research universities.

Founded in 2010, the NAI recognizes and encourages inventors with patents issued from the U.S. Patent and Trademark Office, promotes academic technology and innovation, encourages the disclosure of intellectual property, educates and mentors students, and promotes the benefits of its member institutions' inventions.

K. Krishnamurthy, vice provost for research, will serve on the editorial board of the NAI journal *Technology and Innovation – Proceedings of the National Academy of Inventors*.

S&T TO LAUNCH MICROGRID TRAINING PROGRAM

Missouri S&T will receive $4.3 million over the next five years from the U.S. Department of Energy's SunShot Initiative to develop a power engineering curriculum and launch the Mid-America Regional Microgrid Education and Training Consortium (MARMET). S&T will lead the consortium.

The award is part of a program aimed at lowering the cost of solar-generated electricity, integrating solar energy into the current power grid, and supporting a growing U.S. solar workforce.

"The primary goal of this consortium is to integrate cutting-edge research and advanced instructional methods to create a flexible, evolving approach to microgrid and distributed energy resources training for all levels of students," says **Mariesa Crow**, the Fred W. Finley Distinguished Professor of Electrical and Computer Engineering.

The consortium will do this by developing and distributing modular course material that reflects the newest trends in microgrid engineering. Working with Crow are **Jonathan Kimball**, assistant professor of electrical and computer engineering, **Suzanna Long**, Hist'84, Phys'84, MS EMgt'04, PhD EMgt'07, assistant professor of engineering management and systems engineering, and **Angela Rolufs**, EMgt'84, director of the office of sustainable energy and environmental engagement. ■

A FRIEND TO THE MILITARY

Missouri S&T was named a "top military-friendly school" for 2014 by Military Advanced Education (MAE) and is included in the organization's *2014 Guide to Military-Friendly Colleges and Universities*. MAE selected colleges and universities based on their military culture, financial aid for veterans, flexibility, on-campus support and online support services. For more information about what S&T offers service members and veterans, visit **military.mst.edu.**

Above left: Workers place prestressed-precast concrete deck panels on a bridge near Jefferson City, Mo. Felt bearing pads like the one pictured above, right, are placed between concrete girders and deck panels to prevent cracking as the bridge moves during temperature changes. (Photos by Terry Barner)

SECRET INGREDIENT FOR HIGH-STRENGTH BRIDGES

Last fall, a new bridge was built east of Jefferson City, Mo., that incorporates an unusual, high-strength concrete mix in its girders and support structure. The three-span bridge is outfitted with sensors and other instrumentation to collect data on how well the bridge performs over time.

It's another milestone for **John J. Myers**, professor of civil, architectural and environmental engineering, who worked on the project with the Missouri Department of Transportation and Missouri S&T's National University Transportation Center. Myers has spent the past decade studying and testing high-strength concrete and other innovative concrete systems for implementation.

Myers and his team found that using high-strength, self-consolidating concrete can either extend the span length of the girders — a structure's main support member — or reduce the number of girder lines needed in a given span. Self-consolidating concrete is a high-performance concrete that can flow easily into tight and constricted spaces without separation or the need of vibration to remove trapped air. Myers believes the material will also cost less to maintain and last longer than conventional concrete.

WATCH **THIS**

The "green" bridge's concrete uses higher levels of fly ash, a by-product of coal power plants. Go online for more information and watch the video S&T's bridge to the future:

rol.la/bridgetofuture

OVERVIEW:

INDUCTIONS AND COMMENCEMENT

PROFESSIONAL DEGREES

Missouri S&T awarded two honorary professional degrees during commencement in December. The degrees recognize the following alumni for their professional achievement:

- **Maureen E. Midgley**, ChE'82, of Rochester, Mich., senior vice president of global manufacturing engineering for Henkel Corp.
- **Michael O. Vahle**, Math'71, MS Math'73, chief information officer and vice president of technology services at Sandia National Laboratories.

CURATORS BESTOW FACULTY HONORS

Three S&T faculty members were honored for their scholarship and teaching excellence during commencement ceremonies in December.

V.A. Samaranayake was named Curators' Teaching Professor of mathematics and statistics; **David Riggins** was named Curators' Teaching Professor of mechanical and aerospace engineering; and **Martin Bohner** was named Curators' Professor of mathematics and statistics.

WHITE TELLS GRADS: 'FOLLOW YOUR PASSION'

Let your passion lead you to address "the world's greatest needs," **Gary White**, CE'85, MS CE'87, told 700 new S&T graduates during December 2013 commencement ceremonies. White is CEO of Water.org, which helps people in developing nations gain access to safe water and sanitation.

White, who co-founded Water.org with actor Matt Damon, discussed his journey as a social entrepreneur and the relevance of his journey to new graduates.

"Your life should be about finding the intersection of your greatest passion and the world's greatest needs," White told the graduates.

During commencement, White was awarded the doctor of engineering degree, honoris causa.

ACADEMY INDUCTIONS

In October, 14 alumni and friends were inducted into Missouri S&T academies. Academy membership recognizes a career of distinction and invites members to share their wisdom, influence and resources with faculty and students. Induction ceremonies are held in April and October.

ACADEMY OF MECHANICAL AND AEROSPACE ENGINEERING

TRAVIS L. DURAND, MS ME'85, of St. Louis, director of engineering, Boeing Military Aircraft, The Boeing Co.

ANDREW P. JOHNSTON, AE'91, MS ME'93, of Huntsville, Ala., director of the space systems department of Jacobs Engineering

JOHN PIERRE POWELL, AE'87, of Denver, president and general manager of PAMCO Investments Corp.

JEFF SIMMONS, ME'82, of Houston, president and general manager of Oxy Permian CO2, Occidental Petroleum Corp.

THOMAS WHAM, ME'88, of St. Louis, senior vice president of enterprise process and data governance for MasterCard Worldwide

ACADEMY OF MINER ATHLETICS

ARTHUR H. BELL, ChE'72, baseball team, a Cincinnati physician and former engineer for DuPont, Monsanto and Exxon

SIDNEY E. DUERR, MinE'50, PetE'50, football team, of Corpus Christi, Texas, co-owner of Duerr Consulting

MICHAEL FRIDLEY, CE'69, MS EMgt'70, football team, of St. Louis, vice president and sales manager for Chem-Soly Inc.

RANDY HAUSER, MetE'83, football team, of Chicago, CEO of Chicago Metal Fabricators

LT. COL. KEN JOBE, GGph'60, MinE'60, football and basketball teams, of Virginia Beach, Va., retired deputy team chief for the Chief of Engineers Inspector General in Washington, D.C., with the U.S. Army Corps of Engineers

JOHN PETER LEGSDIN, Econ'70, golf team, of Springfield, Mo., retired from General Electric

GREGORY D. MCCLAIN, EMgt'72, ME'72, football team, of Waterloo, Iowa, CEO and president of RYM Global LLC

MICHAEL VANCIL, CerE'60, cross country team, of Morgan Hill, Calif., director of amateur sports for the American Motorcyclist Association and director of dealer membership for the Motorcycle Industry Council

STEVE YOUNG, GGph'95, track and cross country teams, of New Orleans, senior production geologist for Shell Exploration and Production Co.

GREEK YOUR iPHONE

College students and alumni with iPhones may soon be able to show off their fraternity or sorority pride thanks to Connor Wolk, a sophomore in mechanical engineering, and his business partner, Taylor Jay, a student at the University of Kansas. The pair recently launched Dual Cases LLC to make lightweight yet sturdy iPhone cases that can be customized with Greek letters.

The company is one of four student-owned startups housed in the Student Business Incubator at S&T's Technology Development Center, located in Innovation Park.

The idea for Dual Cases LLC was born in the summer of 2012, while Wolk and Jay were both working as interns for VMH International in their hometown of Chesterfield, Mo.

"We both had iPhones, and we talked about how all the cases (on the market) added a lot of bulk," Wolk says.

So they came up with a two-layered case design — that's the "dual" in the name Dual Cases. Wolk's prototype, which he uses to protect his own phone, consists of a shock-absorbent rubber inner layer and a black plastic outer layer and sports the letters of his fraternity, Sigma Nu. The case is flush with an iPhone's screen and fits snug against the phone's beveled corners.

Last fall, Wolk pitched his business idea at the Missouri Tech Expo Elevator Pitch Competition in Columbia.

"You have five minutes to pitch your idea, then two minutes for Q&A," Wolk says.

He won second place at that event, and $750 toward his fledgling business. He also won second place and $1,000 at another event. Wolk invested that money in designing and developing a website and printing business cards while continuing his quest for further funding.

Learn more and track Wolk's progress on Twitter (**@dualcases**) and Facebook (**facebook.com/dualcasesusa**). ■

SAVE THE DATE: **HOMECOMING 2014**

Mark your calendars and make plans now to attend Homecoming Oct. 17-18. Return to Rolla to reconnect with former classmates and celebrate your Miner spirit. Watch the Summer issue of *Missouri S&T Magazine* for details and find hotel information at **mineralumni.com/homecoming**.

106TH BEST EVER

The Miner Alumni Association and the Central Ozarks Section hosted their 106th Best Ever St. Pat's celebration on March 15 in Rolla. The celebration kicked off with a pre-parade breakfast on the Castleman Hall patio with complimentary coffee, juice and assorted pastries. Immediately following the parade, alumni and friends returned to Castleman for free grilled hot dogs and dollar beer.

ALUMNI **RECONNECTED AND WON**

James Barnes, Engl'94, **Jonathan DiMartino**, CE'08, and **Michael Cerulo**, EE'74, won 2014 St. Pat's sweatshirts as winners of the Stay-Connected Sweepstakes.

The sweepstakes, featured on the back cover of the Fall/Winter 2013 issue of *Missouri S&T Magazine*, encouraged all Miners to share updated information about their current whereabouts.

You can try for another chance to win in this issue. Check out the "Lost Miners" contest on page 31.

MANUFACTURING IN 3-D

Frank Liou (right) and S&T student Chris Abbott demonstrate metal disposition in S&T's Laser Aided Manufacturing Process (LAMP) Laboratory.

"IN MANY AEROSPACE OR BIOMEDICAL APPLICATIONS, YOU CANNOT AFFORD METAL FATIGUE ..."

— Frank Liou

Using a process similar to 3-D printing, **Frank Liou** and his fellow researchers in S&T's Laser Aided Manufacturing Process (LAMP) Laboratory are developing computer models of various additive manufacturing approaches that he believes will help researchers understand how layered materials bond to the surface on which they're deposited.

Liou, the Michael and Joyce Bytnar Professor of Product Innovation and Creativity in mechanical and aerospace engineering, recently received $750,000 in funding from NASA to show how additive manufacturing could help the space agency build stronger, more durable materials for aircraft components.

Liou has been working on additive manufacturing for the past 15 years. He uses high-powered lasers to melt small particles of powdered materials as they exit a nozzle to create three-dimensional shapes, layer by layer. The process creates a denser, stronger material than conventional milling, machining or forging could produce.

Additive manufacturing has a broad range of applications — from large aircraft components to miniscule biomaterials used in surgical procedures. In his latest research, Liou is examining ways to use the technique to create aircraft components from two different materials.

"In many aerospace or biomedical applications, you cannot afford metal fatigue," or cracking of the material, Liou says. "It is important to understand how well a deposited metal bonds to the surface" to avoid metal fatigue. ■

Ozark Angel Investors work with S&T's office of technology transfer and economic development to help inventors succeed.

ANGELS IN THE OZARKS

Imagine you have created the widget and are ready to take the world by storm with your new invention. You sunk your life savings into the project, but fell short on cash to continue developing your business. Enter the angel investor, who provides business start-up capital in exchange for ownership equity.

Ozark Angel Investors is a group of such individuals who are dedicated to developing the economy of Rolla, Phelps County and the region by investing in local companies and entrepreneurs at an early stage. These investors, many former entrepreneurs themselves, pool their money to invest in high-risk, high-potential business ventures.

The investors, some of whom are S&T alumni, want to see the local area continue to advance. They work with S&T's office of technology transfer and economic development (TTED) staff **Keith Strassner**, Chem'79, and **Malcolm Townes**, ME'95. The two serve as filters for investment opportunities and prepare people to pitch their projects and ideas to the potential investors. Strassner and Townes work closely with **James Sowers**, CSci'69, a member of the Ozark Angel Investors and president of JRS Enterprises Inc.

Chancellor **Cheryl B. Schrader**, **Delbert Day**, CerE'58, Curators' Professor emeritus of ceramic engineering, and retired Phelps County Bank President Bill Marshall are a few of the prominent community members who serve on the group's board of directors.

"The group wants to see job growth in the local area," explains Townes, associate director of TTED. "The investors are patient enough to look forward to the future and the return on investment that companies will have five to seven years down the road."

Pitches come fast from the S&T campus, where many students and young alumni form their initial ideas, Strassner says. The Student Business Incubator at Missouri S&T's Technology Development Center, located in Innovation Park, allows for great ideas to develop. Strassner and Townes help guide the larger-scale student projects.

The group hopes to bring additional technology-driven businesses to the local area. Securities and Exchange Commission-qualified investors who are ready to not only invest, but also offer their experience and connections, can find out more information about joining the Ozark Angel Investors by contacting Sowers at 573-364-6634 or emailing jrsowers@rollanet.org. For additional information about Innovation Park, call 573-341-4690 or email ecodevo@mst.edu. ■

MINERS **GIVE BACK**

April is Philanthropy Month at Missouri S&T. It's a time to celebrate giving, growth, pride and progress — and the philanthropic spirit that unites Miner Nation. All month, the campus will be turning the spotlight on the vital role philanthropy plays in our society with a number of on-campus events.

At the second annual Battle of the Brains Scholarship Banquet and Trivia Night, hosted by the Miner Alumni Association and Missouri S&T, representatives from student organizations will compete alongside alumni donors for a chance to take home a total of $1,100 for a philanthropic event, activity or donation of their choosing. Students Today, Alumni Tomorrow (STAT) selected and recruited the organizations for the April 25 event.

Other events this month include academy and alumni board meetings, and the Woman of the Year celebration.

If you can't make it back to campus this month ...

You can get inspired and find opportunities to volunteer your time or support a good cause by going to **rol.la/minersgiveback**.

Here you'll find 30 stories of Miners serving others through their gifts of time and treasure.

MEN'S BASKETBALL PLAYER NAMED **ACADEMIC ALL-AMERICA OF THE YEAR**

Photo by Sam O'Keefe

Bryce Foster, a senior in business and management systems from Florissant, Mo., is the Capital One Academic All-America of the Year award winner for NCAA Division II men's basketball as selected by the College Sports Information Directors of America. He was chosen for the Academic All-America first team.

Foster is the fourth student-athlete and the first men's basketball player to earn the award. A member of Missouri S&T's Honor Roll and the Great Lakes Valley Conference (GLVC) All-Academic team, Foster was also selected to the Academic All-District squad for the NCAA Division II Midwest region.

Foster ranks second in the GLVC and 17th in NCAA Division II in scoring with an average of 21.6 points a game and led the team in three-point baskets with 66.

This past season, he scored 20 or more points 17 times. He scored a career-high 36 points against Truman State and posted the school's first-ever triple double in a Dec. 8 win over Webster with 22 points, 10 rebounds and a career-high 10 assists. He finished his career third on the Miners' all-time scoring list with 1,683 points.

SPORTS BY THE NUMBERS

3.86 meters

School-record pole vault by **Taylor Cipicchio**, a senior in applied mathematics. Cipicchio also set a new record at the Great Lakes Valley Conference Indoor Track and Field Championships and finished in a tie for fourth at the NCAA Division II indoor meet.

210

Career three-point baskets made by Lady Miner **Toni Knar**, a senior in biological sciences. It is the second-most in school history, behind **TrishVan Diggelen**, Hist'92. As of March 3, Knar was eighth in NCAA Division II with a three-point percentage of .451.

302

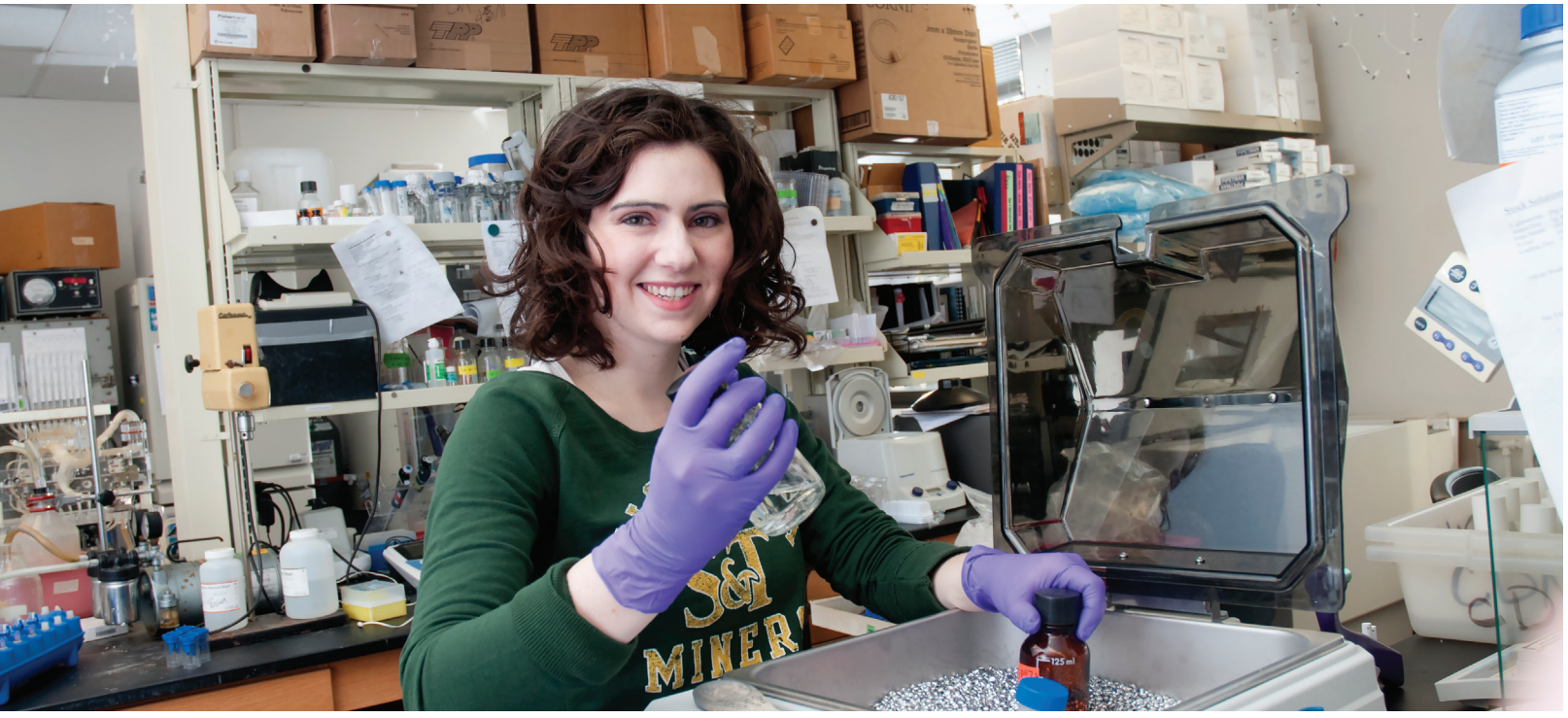
Total career innings pitched by S&T's **John Auble**, a junior in architectural engineering, and **Kyle Robertson**, a senior in electrical engineering, two of the Miners' top starting pitchers heading into the 2014 season.

47

The combined number of stolen bases at the start of the 2014 season for the **Davis** sisters, who have been a part of the Missouri S&T softball team. **Becky**, Math'10, finished with 33, and **Andi**, a sophomore in chemical engineering, had 14 in her freshman year.

21.49 seconds

School-record time posted by **Adriel Hawkins**, a senior in engineering management, in the indoor 200-meters, which eventually led to a sixth-place finish at the NCAA Division II Indoor Track and Field Championships. He also broke the GLVC record in the event during the season.



Junior chemistry student Hannah Frye's work in the neurobiology lab could lead to a treatment for diseases like Alzheimer's or Parkinson's.

HANNAH FRYE: PATHWAYS TO THE PERFECT FIT

At first glance, it is impossible to tell that Hannah Frye, a junior in chemistry with an emphasis in biochemistry, is helping Robert Aronstam perform groundbreaking research that could lead to treatments for diseases like Alzheimer's or Parkinson's. But stop her in the Havener Center at lunch and ask her about her work with the chair of biological sciences and she can explain anything from cell signaling to how she measures the calcium levels in a cell's endoplasmic reticulum and cytoplasm.

Since starting in Aronstam's lab two years ago, the Lee's Summit, Mo., native has been studying how muscarinic acetylcholine receptors react to different pharmaceuticals. Acetylcholine is a neurotransmitter necessary for learning and concentration, as well as muscle movement. The receptor interaction with a transducer G protein determines the biological reaction pathway that the receptor will activate.

In degenerative diseases like Alzheimer's and Parkinson's, acetylcholine neurons disappear. Current treatments, which are only marginally effective, are designed to increase transmission in the acetylcholine cells that remain. Frye and Aronstam hope that by manipulating the pattern of acetylcholine signaling, they may be able to preserve that signaling for as long as possible.

"It's still a new idea, but Alzheimer's alters G proteins to make them go down different pathways too," she says. "If you can understand how a G protein's signaling changes, then you could possibly use gene therapy to correct the disease.

"It's easy to measure the reactions with M1 and M3 muscarinic receptors because they emit calcium, but to measure the response of M2 and M4 receptors, you have to mutate a G protein so that the cell emits calcium," Frye says. "It's a wolf in sheep's clothing." By mutating the DNA coding for G proteins, Frye has altered the pattern of coupling between G proteins and their receptors in an way that may mimic changes that occur in diseases.

When she isn't in the lab, Frye works as a resident assistant on campus. She's also vice president of the International Genetically Engineered Machines (iGEM) Team and a member of Alpha Chi Sigma, a professional chemistry fraternity.

Frye says she has found the perfect fit in her research and in S&T, and she knows others can too.

"I enjoy the ability to expand my knowledge base with research that is outside of my normal coursework," she says. "It is my goal to demonstrate that this school is truly a place where opportunities for personal, academic and professional growth are abundant." ■

REDEFINING

NEW ROLES FOR GOVERNMENT, CORPORATE SPONSORS

by Andrew Careaga | acareaga@mst.edu

Like many schools in the United States, Missouri S&T came of age as a research university during the U.S.-Soviet "Space Race" of the 1960s. Back then, much of the research conducted on campus was funded by the federal government and usually involved the practical application of knowledge to meet specific needs. Today, most research conducted at S&T is still "applied" in nature, but the clients have changed. The private sector has become a significant source of research funding for Missouri S&T, and many expect that trend to continue – here in Rolla and in university research labs throughout the U.S. How this shift in funding affects the role of U.S. research universities is a subject that is generating interest not just at S&T, but across our nation.

THE REALITY OF RESEARCH

"THERE'S A HUGE PARADIGM SHIFT COMING FOR RESEARCH UNIVERSITIES"

They're called small modular reactors, or SMRs for short. The U.S. Department of Energy touts these pre-fabricated reactors as "clean, affordable nuclear power options" that will help meet America's future energy demands.

SMRs power the U.S. Navy's nuclear submarines but haven't been fully developed for public use. The United States is in a race with China, France and Russia to bring them online within a decade.

With expertise in nuclear engineering, Missouri S&T plans to make SMRs a reality. Last summer, Missouri S&T and the University of Missouri-Columbia joined with two private corporations — St. Louis-based energy company Ameren and Westinghouse Electric Co., based in Pittsburgh — to accelerate SMR research and development in the state. The resulting partnership, S&T's SMR Research and Education Consortium, also received $250,000 in seed funding from a fifth entity: Missouri Technology Corp., which the state legislature created to earmark state funds for promising new tech-focused ventures. "The consortium will support member-driven research efforts aimed at advancing SMR technology" that can help get some pre-fab nuclear plants up and running in the state, says consortium director **Joseph Smith**, the Wayne and Gayle Laufer Chair of Energy at Missouri S&T.

This approach to research — blending taxpayer dollars with corporate funds to benefit business interests and support economic development — may not be the image that comes to mind when you think about university research. Perhaps you envision a lone genius in a lab coat, toiling over test tubes and mathematical formulas, waiting for that *Eureka!* moment of discovery to strike.

The reality of research at Missouri S&T, however, is that much of it is "applied" — that is, conducted to achieve a specific outcome. And much of it is funded by the private sector. During the 2012–2013 fiscal year, Missouri S&T received the majority of its research funding from private sources instead of federal agencies for the first time, while overall research expenditures increased by more than 5 percent, the number of patents filed by S&T inventors grew by 14 percent, and licensing and option agreements nearly doubled.

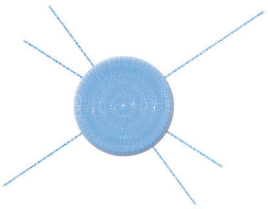
This partnership with the private sector is embedded in S&T's strategic plan, which lists both corporate partners and research agencies as key customer groups for the campus. This growth in sponsored research from the private sector is likely to continue, Smith believes.

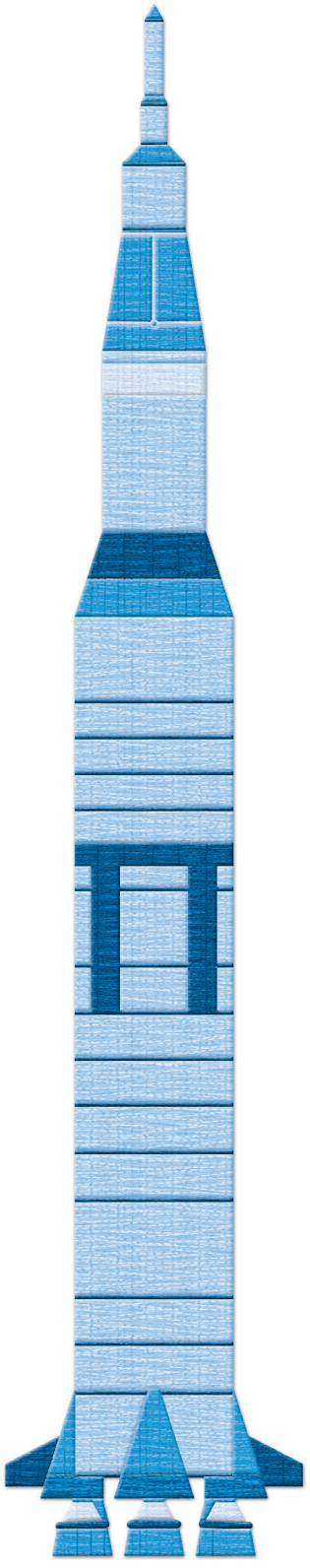
"There's a huge paradigm shift coming for research universities," says Smith, who worked in both the private sector (Dow Chemical) and the federal government (Idaho National Laboratory) before joining Missouri S&T in 2011. "You'll see industry putting more money into research, so research universities will see more industry involvement."

At Missouri S&T, the SMR Research and Education Consortium is the latest example of that approach. Other university-industry partnerships include the Center for Electromagnetic

FIRING UP THE ION DRIVE

Ever since the Wright brothers flew at Kitty Hawk, the goals of aviation have seemed simultaneously overly ambitious and within reach. It's no different at Missouri S&T, where researchers are using a pulsed theta pinch to study the physics of high-density, heavy-gas plasma for ion space propulsion in order to meet (and in some cases exceed) the demands of future NASA missions. Inside S&T's Space and High-Altitude Environment Testing Facility, researchers analyze multiple ion drive propulsion systems.





Compatibility, which draws on S&T's expertise to address electromagnetic interference problems (so that airline passengers can one day keep their smart phones running even during takeoff), and the Center for Aerospace Manufacturing Technologies, which offers R&D expertise to the aerospace industry. Last year, a dozen companies joined forces with S&T to establish the Kent D. Peaslee Steel Manufacturing Research Center to take advantage of the university's expertise in steel casting and manufacturing research. These groups charge companies fees to access university brainpower, and member companies are more than happy to pay. In exchange, consortium members also get a say in the types of research that takes place.

END OF THE NASA ERA

Missouri S&T's roots as a research university go back half a century, to the era of the U.S.-Soviet "Space Race." Soon after the Soviet Union's 1957 launch of the first satellite, *Sputnik*, the federal government began pouring dollars into NASA and other agencies in hopes of beating the Soviets in a race to land on the moon. State governments also beefed up funding to support research in their public universities. One of S&T's first research centers, the Graduate Center for Materials Research, was founded in 1963 through a $2 million state appropriation. A couple of years earlier, the state's first nuclear reactor was dedicated on the campus and the University of Missouri System Board of Curators approved the organization of MSM Research Laboratories "to encourage basic and applied research … in all engineering and science disciplines."

Missouri S&T was becoming a full-fledged research university. The research enterprise at S&T expanded, even as the campus stayed true to its pragmatic engineering and science education roots. The bulk of sponsored research focused on science and technology projects. Federally funded research in areas like materials science and engineering, energy, civil infrastructure and manufacturing flourished, and the campus built a solid reputation in these disciplines. Over time, that expertise led to some unexpected ventures. **Delbert E. Day**, CerE'58, Curators' Professor emeritus of ceramic engineering, applied his expertise to the realm of medicine and created microscopic glass beads to treat liver cancer. The success of that venture led Day to start his own company, Rolla-based MO-SCI, which is now developing other innovative ways to use glass for medical treatment. Civil engineering professors are working with the Missouri Department of Transportation to put

CLEARING ELECTRONIC TRAFFIC JAMS

Over the past few decades, the number of electronic and electrical devices has skyrocketed, as has the amount of radio waves that can interfere with other devices. That's where researchers in S&T's Electromagnetic Compatibility Laboratory come in. Inside the EMC's versatile semi-anechoic chamber, energy can't get out or in. This controlled environment eliminates outside ambient noise and allows researchers to test emissions and immunity on big screen TVs and other digital devices.

their ideas for stronger roads and bridges to the test in the real world, on real roads and bridges in the state. Electrical engineers and computer scientists are working with researchers at other universities to map out a future "Internet for energy," and are using the university's Solar Village, a complex of four solar-powered houses, as a test bed. And in an unusual example of how so-called big data can help researchers recognize patterns, one computer science faculty member is analyzing student Internet use for clues about how certain online activity could signal mental health disorders, such as depression.

"IF WE DON'T INVEST IN RESEARCH WE WILL FALL FURTHER BEHIND"

Given these examples, it would seem that S&T's research enterprise is thriving. And it is, thanks to a broad portfolio of support from the private sector, the state and federal government, and other university partners.

Over the past half century or so, federal funding for basic research has played a role in everything from mapping the human genome to building the Internet. But the prospect of less federal support in the future is a genuine threat to research universities like Missouri S&T.

Last year, federal funds for research declined at a level not seen since the early 1970s, when the *Apollo* space flight program ended, says **K. Krishnamurthy**, vice provost for research. Moreover, the government is changing the way it allocates public dollars for research. It's placing more emphasis on funding projects that support specific outcomes, like the SMR initiative, than on theoretical or experimental research.

Don H. Madison, Curators' Professor of physics, has witnessed this change first-hand. The National Science Foundation, which funds much of Madison's basic research in atomic physics, "is shifting priorities for projects" to more applied approaches, he notes. As a result, "it reduces the amount of money they have for basic research," Madison adds.

Also, in an effort to curtail government waste, congressional earmarks went away a few years ago. Alaska's infamous "bridge to nowhere" stands as the iconic example of earmark spending gone awry. S&T's Center for Aerospace Manufacturing Technologies is the opposite: a congressional earmark that encouraged private investment in university research.

Last year, budget sequestration — automatic cuts in federal spending — threatened future research funding and brought projects to a standstill. The NSF, Department of Defense and Department of Energy — all major sponsors of S&T research — were targets of sequestration.

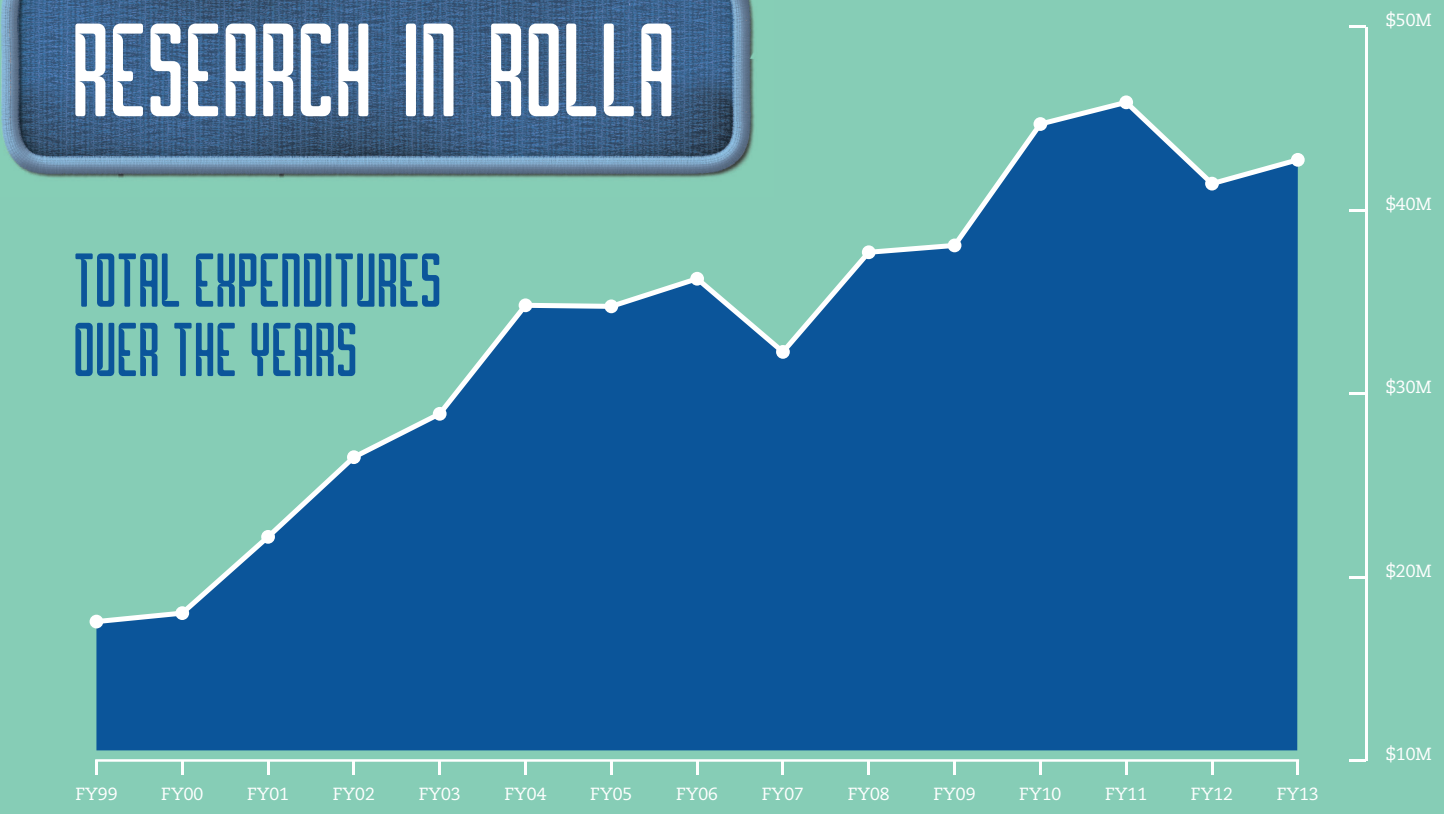
Those budget uncertainties in Washington, D.C., led the American Association of Universities and the Association of Public and Land-Grant Universities to appeal to Congress and President Obama to "close the innovation deficit." In a July 31 letter, signed by 165 university leaders, including Missouri S&T Chancellor **Cheryl B. Schrader**, the two organizations urged lawmakers to "reject unsound budget cuts and recommit to strong and sustained investments in research and education."

That approach may have worked, at least in the short term. A two-year budget deal passed by Congress last December spared key research agencies from deep cuts. But "the (funding) uncertainties have a major effect" on current research or planning future initiatives, says Krishnamurthy. "If you don't know what the budget will be, then your faculty will be reluctant to hire graduate students or post-docs.

"If we don't invest in research we will fall further behind" in terms of global competitiveness, Krishnamurthy says. But "the long-term impact" of cuts to research funding, he says, is the toll it will take on human capital.

"The underlying reason why we need these investments," he says, "is because we are investing in people — the students, postdoctoral fellows and faculty who are creating new knowledge and innovation and advancing the frontiers of science."

RESEARCH IN ROLLA



ENDOWMENT BRINGS YOUNG TALENT TO MATERIALS SCIENCE AND ENGINEERING

When **Wayne Huebner** learned that his department had received an endowment of more than $1 million from the estate of **G. Robert**, ChE'41, and **Roberta Couch** with just a single requirement — to attract and retain top faculty members in materials science and engineering — he decided to do things a bit differently.

"We elected to invest in the future," says Huebner, CerE'82, PhD CerE'87, chair of materials science and engineering. "Most of us will retire in 10 or 15 years and we wanted to ensure that the best people come here, so we split it into two assistant professorships. The endowment earnings provide a great start-up package for new faculty and may be the only permanently endowed assistant professorship fund in the entire University of Missouri System"

Mohsen Asle Zaeem and **Caizhi Zhou** joined Missouri S&T as the Roberta and G. Robert Couch Assistant Professors of Materials Science and Engineering in August 2012 and January 2013, respectively. Both are involved in the Materials Genome Initiative, a public-private endeavor that the Obama administration started to discover, manufacture and deploy advanced materials in half the time and at a fraction of the cost.

"Now if we want to replace a material in a car or an airplane, it takes about 10 years to do all the tests, get the licenses, and install and test it before the material can be approved," says Asle Zaeem. "We hope to reduce this material cycle to two years."

The researchers use computational modeling and simulation of materials structures and properties before ever heading to the lab. "We model the microstructure evolution during materials deformation," says Zhou. "We hope to identify the relationship between microstructure and the macroscopic mechanical response of metals, alloys and advanced structural materials."

Asle Zaeem says the Couch endowment permitted him to hire a post-doctoral research associate to work on a new type of modeling, called phase field crystal modeling. "This modeling mixes mathematics, physics and thermodynamics. We hope it will eventually be a predictive tool for materials design," he says.

Couch worked closely with the late **Thomas J. O'Keefe**, Curators' Professor emeritus of metallurgical engineering, when Couch was president of the Specialty Division of AMAX Inc., a mining services company.

"Professor O'Keefe really helped Mr. Couch's company achieve success," says Huebner. "Mr. Couch said he would create an endowed professorship in this department and we are the grateful recipients of his forward-thinking generosity." ■

FISCAL YEAR 2013 SUMMARY

Proposals submitted
488

Dollars requested
$140.7 MILLION

Proposals awarded and amendments
265

Dollars awarded
$51.5 MILLION

Total expenditures
$42.7 MILLION

Faculty and staff serving as principal or co-principal investigators
234

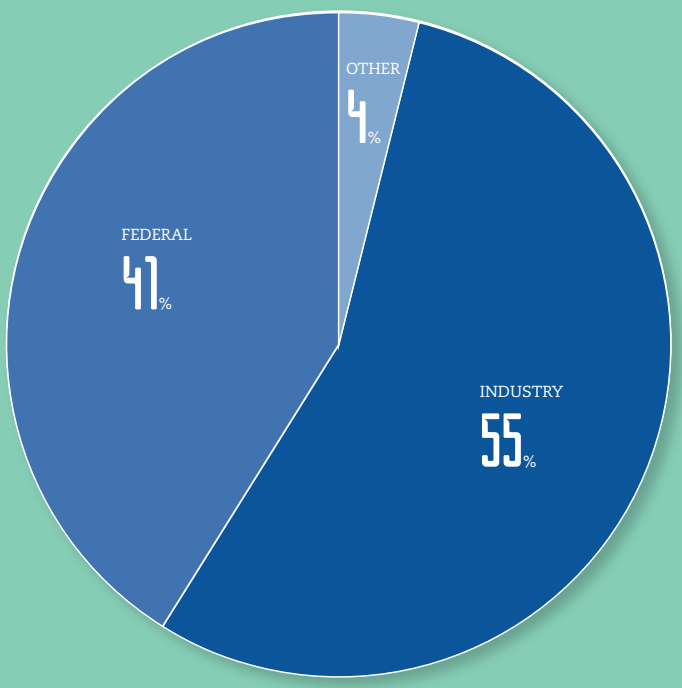
Invention disclosures
41

Patent applications filed
25

Patents issued
11

Licenses/Options signed
14

Licensing income
$220 THOUSAND



FY13 sponsored awards by source (total amount: $51.5 million)

RESEARCH: NOT JUST FOR GRAD STUDENTS

Missouri S&T is known for providing its undergraduates with lots of opportunities for hands-on learning, and research is a big part of that. *Missouri S&T Magazine* staff asked **Jeffrey D. Cawlfield**, vice provost for undergraduate studies, to share his views about the importance of providing research opportunities for undergraduate students.

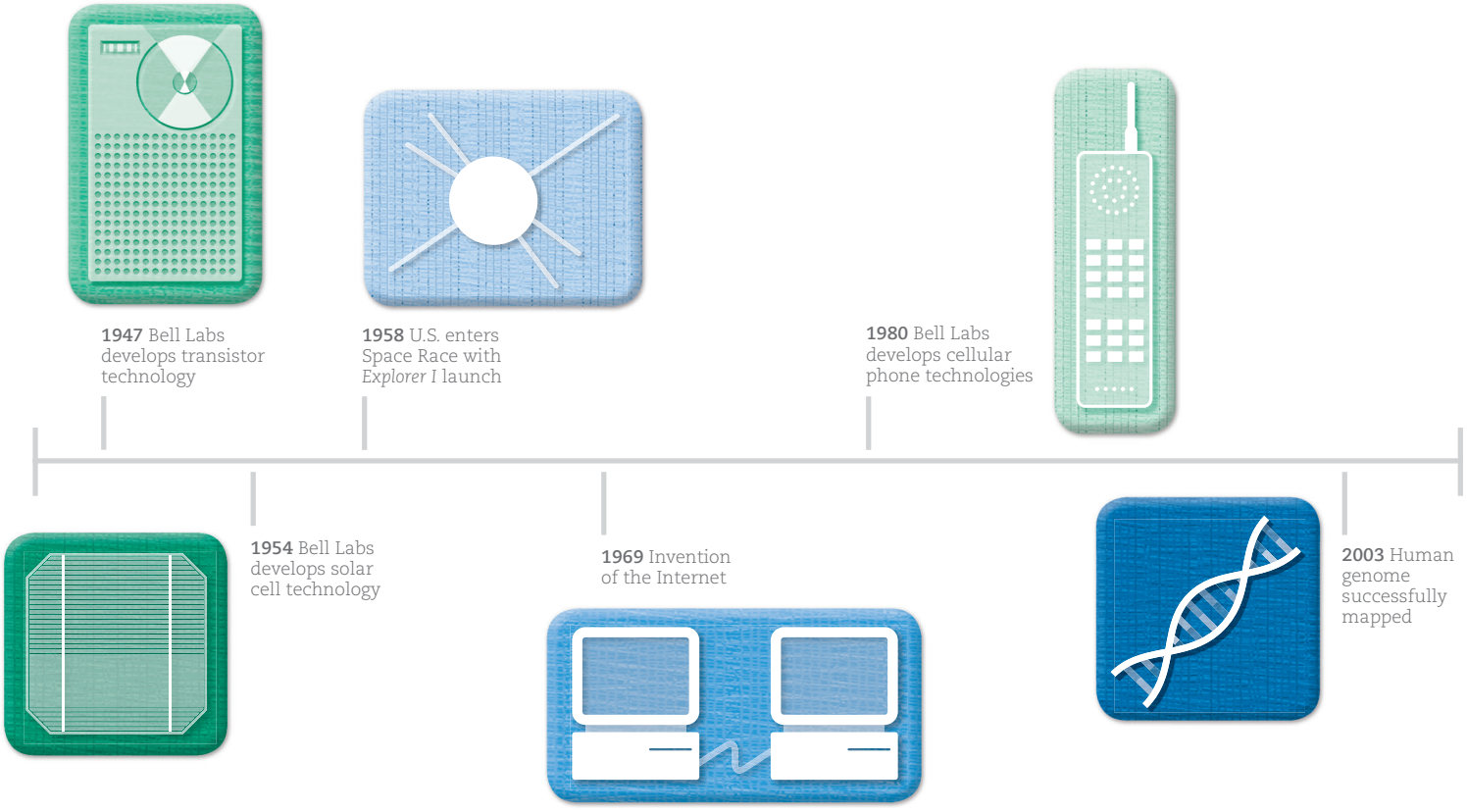
Why is research important for undergraduate students?
Studies have found that undergraduates who performed experiential learning activities outside the traditional classroom structure are more likely to graduate and be more satisfied with their major. Undergraduate research undertaken at an early point in a student's career is often cited as an example. The National Survey of Student Engagement recently conducted a survey of nearly 335,000 first-year and senior students, and found that first-year students who participated in at least one program — like a learning community, service-learning or research with a faculty member — reported greater knowledge, skills and personal development. They were more satisfied with their whole college experience, and more likely to choose the same institution if they were to start over again.

How does it benefit a student?
Experiential learning activities contribute to a student's self-confidence, which leads to motivation, which drives student engagement and success. It's a simple premise: a student participates in an undergraduate research project, has meaningful interactions with a faculty member and other students, overcomes some challenges and roadblocks, successfully completes the research experience, and emerges with more self-confidence. That builds motivation and engagement with classwork and commitment to the major field of study. A student who participates in study abroad, internship or co-op, or student design teams could see the same benefit.

How does research inspire creative thinking in undergraduate students?
Research is often a lot like a trouble-shooting assignment. You have to do some trial-and-error to figure out the best alternatives because a single best solution may not exist. Often the most difficult aspect of a research project is actually figuring out the correct questions to ask, rather than trying to immediately answer the first question posed. Studies have shown that students who participate in undergraduate research with faculty are more likely to persist, gain more intellectually and personally, and choose research-related fields as a career. ■

TRANSFORMING INFRASTRUCTURE REPAIR

As roads and bridges across the country continue to age and deteriorate, state and federal agencies are seeking ways to rebuild and revitalize the failing transportation system. Missouri S&T is helping. Inside the High-Bay Structural Engineering Research Laboratory in Butler-Carlton Civil Engineering Hall, researchers use specialized equipment to simulate loading, vibrations and other real-world conditions that are critical to testing and evaluating new infrastructure systems. In this environment, they push materials to extremes to predict when they might fail.



BUSINESS OF RESEARCH

Before the Space Race and Cold War eras, a handful of big corporations played a major role in advancing both applied and basic research. The most notable example is AT&T's Bell Telephone Laboratories. At the height of its productivity, Bell Labs employed some 1,200 science and engineering research Ph.D.s at its expansive campus in Murray Hill, N.J. Their work led to astounding achievements, including the creation of the first transistor and cell phone, silicon solar cells and laser technology. From the 1930s through the 1970s, Bell Labs was "the country's intellectual utopia," writes Jon Gertner in his book, *The Idea Factory: Bell Labs and the Great Age of American Innovation*. Much of Bell Labs' success was due to the leadership of **Mervin J. Kelly**, Chem 1914, who served as president from 1951 through 1959.

It's doubtful that we'll see another private-sector research giant like Bell Labs anytime soon. AT&T was a monopoly that poured ample funding into its R&D effort. It's also doubtful that federal funding for research will rise to Space Race levels, according to Smith.

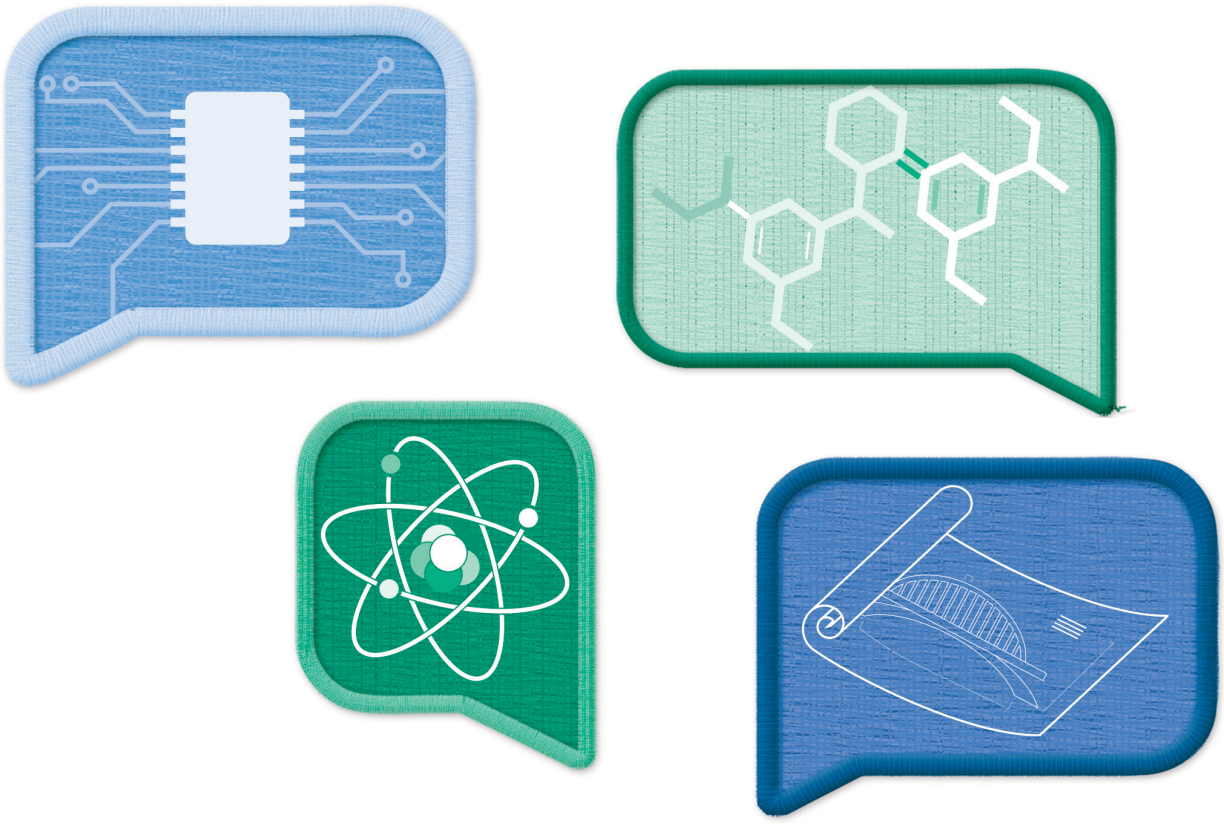
"Government research will still be part of the equation," says Smith. "But it will have to be scaled back because the government can't afford it. Washington can't afford to live in the NASA era anymore."

While he was with Dow Chemical in the 1990s, Smith says the company outsourced $100 million annually on research to universities. While most companies cannot afford that level of R&D, they do seek the expertise of university faculty to help them solve their research problems, he says. Such is the case with Ameren and Westinghouse, as founding partners in the Small Modular Reactor Research and Education Consortium. Companies

> "GOVERNMENT RESEARCH WILL STILL BE PART OF THE EQUATION"

A DRIVING FORCE FOR THE FUTURE

The demand for the nation's automotive and manufacturing industries to provide safe, affordable vehicles with better fuel economy has never been greater. S&T is at the center of a consortium with the steel industry and is home to the Kent D. Peaslee Steel Manufacturing Research Center. Working with steel manufacturers, suppliers and other industry partners, S&T researchers seek to reduce a vehicle's overall weight by developing lighter and stronger materials.



"IF YOU'RE GOOD AND YOU'VE GOT GOOD IDEAS, YOU'RE GOING TO GET SUPPORT FOR YOUR WORK"

simply don't have the expertise or facilities to conduct the in-depth research that will lead to the next big thing in innovation, so they turn to universities.

So, as Smith sees it, the partnership between university and corporation is mutually beneficial. But are there pitfalls to such an arrangement? If universities begin to rely more on corporations for their research dollars, are they at risk of worrying too much about pleasing the companies who pay the bills and ignoring the needs of society at large?

For **Joel Dittmer**, assistant professor of philosophy at Missouri S&T, it boils down to a single question: "What are the motives of the sponsoring entity?"

It would be "stupid, lazy and uncreative" to assert that private-sector groups could not support research that benefits society, says Dittmer, who teaches S&T's Engineering Ethics and Business Ethics courses. "If industry is able to turn a profit while benefiting society, then that doesn't seem problematic," he says.

Even so, universities and university researchers must weigh the benefits of industry-sponsored research with the needs of society, Dittmer says. "I think it's important for the new research university to be responsive to the public. But I don't think we've had a national discussion on this issue."

Meanwhile, the need for basic research will continue, say Krishnamurthy and Madison. Alluding to the Space Race, Madison notes that "the basic research that was necessary" for the *Apollo* moon landing "was developed during the previous 40 or 50 years. We could not have landed a man on the moon in 10 years if the necessary basic research hadn't already been done."

Although Madison sees smaller portions of federal funding going to basic research in the future, and doubts any corporation will invest in such fundamental projects as his atomic-scale studies of charged-particle interactions, he sees a bright future for basic research.

"I'm the eternal optimist," Madison says. "If you're good and you've got good ideas, you're going to get support for your work. But it's more competitive now. What used to have to be good now has to be really, really good." ■

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Representing more than 56,000 alumni worldwide

For more information about your representatives, go to **mineralumni.com**.

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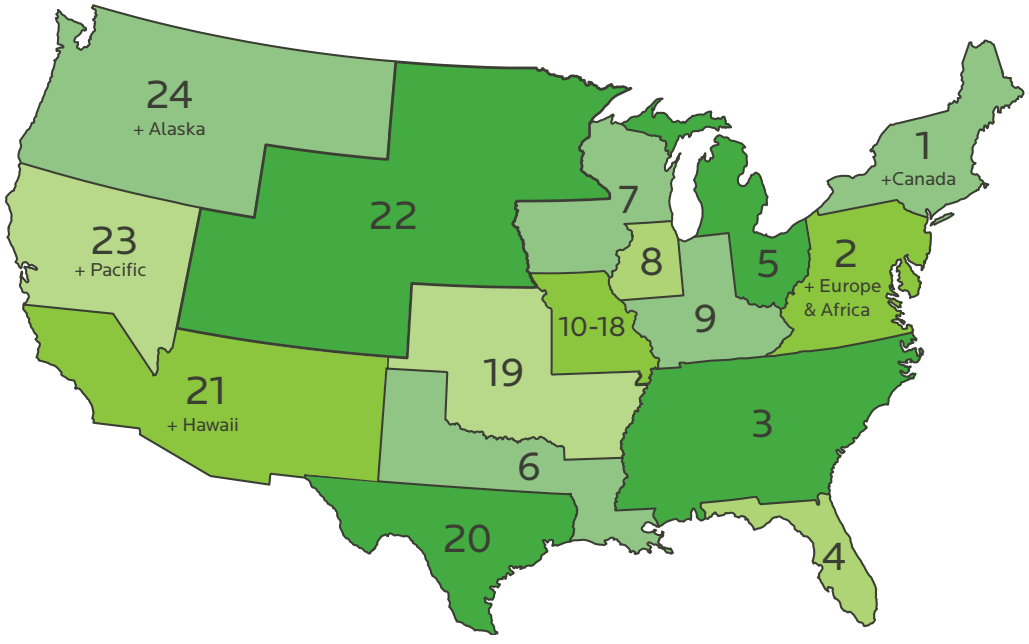


ALUMNI AREAS

The Miner Alumni Association board of directors functions as the eyes, ears and voice of our more than 56,000 living alumni. Please check the map at left and the "area directors" list above to identify your current area director. Contact with your area director is encouraged and appreciated.

ENGAGING ALUMNI

In 2012, the Miner Alumni Association changed the format for its board of directors. What used to be a large number of small committees, each with a narrow focus, has been consolidated into five larger committees with broad goals.

"The new structure combines committees with similar missions to increase collaboration and make the most of the time we have with the board," says **Katie Jackson**, assistant director of alumni affairs and constituent relations.

The board committees are focused on alumni engagement, financial resources, student engagement, communications and marketing, and strengthening campus relations. In the next few issues, we'll introduce you to each of the new groups and give you a glimpse of their mission and how they hope to get there.

The 27 members of the Alumni Engagement Committee work to keep alumni connected to their alma mater through recognition and involvement of alumni, both on campus and in sections around the country. They hope to engage young alumni, make Homecoming the best it can be for returning alumni and help section officers stay in touch with alumni in their area.

It's a big job, but these alumni are ready to accept the challenge.

"Our biggest challenge is reaching our 56,000 alumni and communicating the value in their staying connected or re-connecting with their alma mater," says **Helene Hardy-Pierce**, EMgt'83. "Our young alumni are busy starting their careers and many times, their families, and that is their primary focus. There are myriad reasons to stay connected with Missouri S&T, though, and our job is to make sure that our alumni understand the value in engaging with the Miner Alumni Association."

STUDENT DESIGN TEAM COMPETITIONS COMING YOUR WAY

Miners by Design, the giving society that encourages supporting experiential learning at Missouri S&T, invites alumni to support students by attending one of the upcoming design team competitions. A list of the competitions, sorted by alumni section, follows. Dates of all design team competitions are available at **rol.la/designteamdates**.

Bay Area
Human Powered Vehicle Challenge West
April 25-27
San Jose, Calif.

Motor City
Formula SAE Michigan
May 14-17
Brooklyn, Mich.

Robotics Intelligent Ground Vehicle Competition
June 6-9
Rochester, Mich.

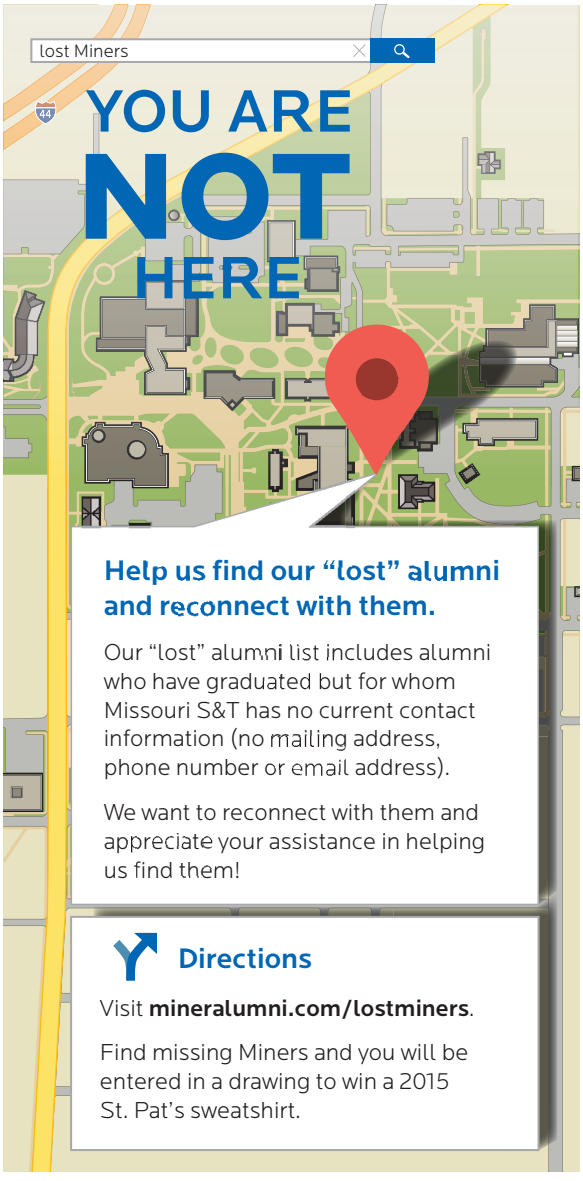
NE-IA
Formula SAE and Formula SAE Electric
June 18-22
Lincoln, Neb.

Oklahoma
American Society of Civil Engineers' Mid-Continent Student Conference — Steel Bridge and Concrete Canoe Team
April 24-26
Stillwater, Okla.

Peoria
Baja SAE Illinois
June 4-7
Peoria, Ill.

Salt Lake City
NASA Student Launch Rocketry Challenge
May 15-17
Bonneville Salt Flats
Tooele County, Utah

SW Florida
Human Powered Vehicle Challenge East
April 11-13
Orlando, Fla.



GET MORE INFORMATION

*Want to know who else is planning to attend a section event in your area? Need more details about an upcoming event? Register online at **mineralumni.com**, click on the events tab, select the events you want to attend and then click registration.*

CLASS **NOTES**

PUBLICATION POLICY

We publish information submitted by alumni, news submitted by employers of alumni, and selected news stories that mention alumni and their affiliation with Missouri S&T. We are happy to announce weddings, births, promotions and other happy occasions after they have occurred. We will print addresses if specifically requested to do so by the alumnus/alumna submitting the note and will mention a spouse's name if it is specifically included in the submission. We reserve the right to edit alumni notes and will use submitted photos as space permits. Due to the production time required for each issue, submissions may take up to six months to appear. Your patience is appreciated.

KEEPING S&T GREEN, ONE BIKE AT A TIME

Dan Fuhrmann, ME'99, owner of Route 66 Bicycles in Rolla, wants to make S&T the model of a bicycle-friendly campus. Fuhrmann donated a Dero Fixit stand, an ADA-compliant bicycle-repair station. It was installed outside Curtis Laws Wilson Library last fall.

"When I was a student, bicycles were technically banned from campus, although the rule was rarely enforced," says Fuhrmann, former president of the S&T Cycling Club. That has changed and Fuhrmann wants everyone to know that S&T is a bicycle-friendly campus. "Bicycle infrastructure is a great investment and I realize that. I hope to bring others on board.

"Anyone can use the stand to perform repairs or adjustments on their bicycle, or stop for a quick shot of air in their tires," Fuhrmann says. It includes a pump with a gauge and also has most of the tools necessary to perform minor adjustments.

"If it keeps people riding their bikes instead of driving, then it's a good thing."

SHARE A **CLASS NOTE**

Let your classmates know what you've been doing. Send us information about your professional and personal accomplishments — career changes or promotions, weddings, births and other news — and we will publish it in an upcoming issue. Email your update and a high-resolution photo (if available) to alumni@mst.edu.

Deadline: Fall/Winter issue — July 15

1943

George H. Thomas, PetE: "Still working nine to five. I'm president of Inland Barge Co., with 67-ton boats and 272 tank barges, moving petroleum products on the intercoastal waterway from Brownsville, Texas, to Pensacola, Fla., and on the Mississippi from New Orleans to Chicago."

1944

Robert J. Kick, MetE, recently celebrated his 90th birthday and 68th wedding anniversary.

1949

Robert J. "Bob" Kemper, CE: "Joan passed away Jan. 27, 2013. We were married 66 years."

1950

Gene J. Peetz, EE: "I've been retired from McDonnell Douglas for 23 years, after serving for 40 years. Anita and I left our large lakefront home in Lake Saint Louis two years ago and moved into Twin Oaks at Heritage Point, a retirement villa in Wentzville, Mo. We have adapted well to the smaller home, it's cozy but comfortable. We've made many new friends and enjoy our leisurely life. We have been blessed with reasonably good health and a wonderful family. We are proud that our grandson is a third-generation Miner, who just completed his freshman year."

Dennis E. Mason
EE'58

Dennis E. Mason was inducted into the Ben Franklin Honor Society of the Printing Industries of America at a black-tie ceremony in Chicago on Nov. 15. Mason is pictured on the far left.

Tom Voss
EE'69

Tom Voss was named 2014 Man of the Year by Variety the Children's Charity of St. Louis. He is chair, president and CEO of Ameren Corp.

1951

William W. Fairchild, GGph: "We came through the September floods here in Longmont, Colo., unscathed. Still enjoying good health and playing tennis three times a week, jazz piano the rest of the time. Would enjoy hearing from old buddies at bfair80503@yahoo.com."

Roy G. Miles, GGph: "At age 84, I'm still active. Sold cottage in Ontario and now I fish local Smith Mountain Lake (near Roanoke, Va.). I also volunteer at the Science Museum of Western Virginia."

Elmer D. Packheiser, ME: "In February 2013, I had a valve inserted up through an artery to replace the malfunctioning aortic valve in my heart. Since this is a new type of valve, I have joined a study group for five years to see if this approach will replace the open heart surgery approach."

1952

John O. Steele, EE: "Shirley, my loving wife of 53 years, passed away in 2007. I am retired from Honeywell FM&T in Kansas City, Mo."

1953

Walker L. Flood, ME: "It's hard to believe that it's been 60 years since graduation from MSM and 23 years since retirement from General Motors. Our Lord has truly blessed us, especially with our two children, three grandchildren and two great-grandchildren. We move a little slower than we used to, but still enjoy every day of retirement."

Nicholas Schurick, CE: "I am enjoying my retirement, keeping busy with my granddaughters Jacquelin and Elizabeth — 15 and 12. I'm grooming them to be Miners."

1955

Campbell C. Barnds III, EE: "In July, after more than 38 years in our home, we moved to Claridge Court in Prairie Village, Kan., a Life Care retirement community. I still do some consulting."

1957

James D. Carl, GGph: "Susan and I enjoy the fall colors in upstate New York and the Adirondack Mountains. We live in a small town with two colleges — Clarkson University and The State University of New York, where I taught in the geology department for 33 years."

Charles A. Wentz Jr., ChE, MS ChE'59, and his wife, Joan, recently returned from a land tour of northern Italy and southern France, followed by a ship cruise of the French and Italian Rivieras. "The history, scenic beauty, food and wine of this region are almost beyond

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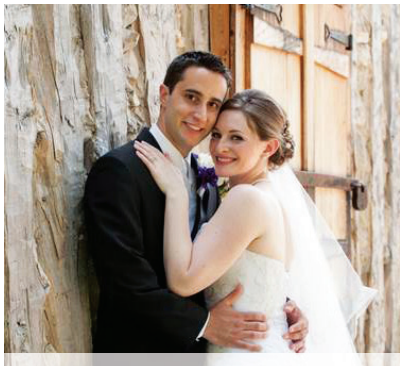
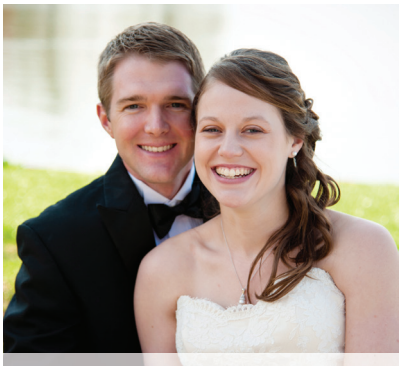
MINER UNIONS

A – L

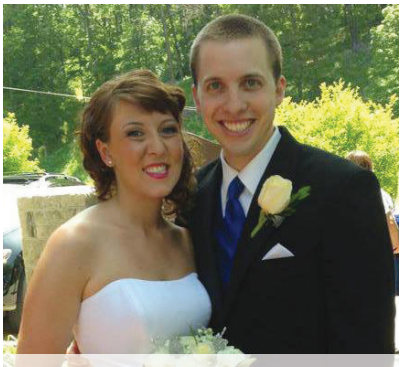
Cox - Westerhoff



Garrabrant - Luer



Hotz - Coulter



Johnson - Regan

Lozier - Galaske

Ryan Cox, GGph'11, married Kimberly Westerhoff on July 19, 2013, in Conifer, Colo. The couple lives in Powell, Wyo.

James Eidson Jr., Bus'02, married Cassandra Jean Goree on May 18, 2013.

Kirsten Luer, EE'10, married Michael Garrabrant on July 7, 2013.

Robert D. Hotz II, CE'07, MS CE'08, married Stephanie Coulter on April 13, 2013, in Edwardsville, Ill.

Tyler Johnson, BioS'09, Hist'09, married Rachel Regan on May 25, 2013, in Weston, Mo. The couple lives in Oklahoma City.

Andy Lozier, ME'06, and **Collette Galaske**, ChE'06, were married on Sept. 3, 2012, in Costa Rica. The couple lives in Omaha, Neb. Relatives include father **Jim Galaske**, MetE'79; mother **Rhonda Galaske**, MetE'79; brother **Clint Galaske**, ME'09; and uncle **Charles "Kevin" Reed**, MetE'83.

(continued on next page)

Moesch - Vessell

MINER UNIONS

M – Z

Turner - Province

Wuest - Bennett

Nikolas Moesch, ME'11, and **Paige (Vessell) Moesch**, EMgt'13, were married on Oct. 19, 2013.

Matthew Turner, MinE'11, and **Jennifer Province**, Bus'09, Econ'09, were married on May 21, 2011, in Belgrade, Mo., where they now live.

Michael Wuest, Bus'07, MBA'08, married Kim Bennett on Nov. 2, 2013, in Columbia, Mo. ■

SISTER OF THE SEAS

Mary Beth Reissen, MS Tch Chem'70, represented the American Society of International Law at the 14th meeting of the Open-Ended Informal Consultative Process on Oceans and the Law of the Sea, held at the United Nations Headquarters in New York City in June.

Reissen, a member of the School Sisters of Notre Dame, says the meeting considered the problem of ocean acidification and ways to address its impact on global, regional and national levels. She has been involved with ocean issues since the 1970s, when she participated in the Third UN Conference on the Law of the Sea.

Reissen earned her Ph.D. in international relations from Tufts University in 2003. She is an adjunct professor in Webster University's Global Citizenship Program and in the graduate program in international affairs at University College of Washington University in St. Louis, where she is designing an online ocean law and policy course.

comprehension. This is one of the best trips we have taken and was certainly a great pleasure. Highly recommended."

1958

John F. Kirse Jr., CE, reported he was getting ready for the Missouri deer archery season in October.

E. Robert Schmidt, ME, MS NucE'59: "I still work part time in retirement. I enjoy my grandchildren and providing labor for my wife's antique business."

1959

Valgene E. Hart, ME: "I continue to enjoy the Missouri Ozarks, but miss the New Mexico mountains after 45 years. Twin daughters are in Colorado Springs and son is in Algeria. Granddaughters are in Florida, Texas, California and Oregon, and twin granddaughters are in Missouri. Grandsons are in Afghanistan and Los Angeles."

1960

Robert R. Belew, ME, has been awarded 10 U.S. patents.

Paul Medley II, EE: "Betty and I still live in Sevierville, Tenn., near the tourist attractions of Pigeon Forge, Gatlinburg and Smoky Mountain National Park. I continue to enjoy my main hobby of motorcycle riding. I've ridden 255,000 miles since May 2001."

James H. "Jim" Painter, ME: "My grandson, Sam, is a senior at S&T. And the beat goes on …"

1963

Edward G. David, CE: "I enjoyed the Golden Alumni Reunion. The program was outstanding and the staff was more than helpful."

Arvinkumar M. Shah, MS ME: "I'm working as a tax-aide coordinator for Huntley, Ill., area, providing free service to seniors. I'm enjoying retired life."

1964

Alan Stricker, CerE: "My wife, Joyce, and I still operate our business, The Nickel Trader Co. We buy and sell rare coins in McMurray, Penn."

1967

David N. Drennan, ChE, was awarded U.S. Patent No. 5,866,273 for "Corrosion-Resistant RAM Powder" on Feb. 2, 1999. He developed the powder with co-inventor Edwin W. Wiggins at The Boeing Co. in St. Louis.

1968

Darrell W. Pepper, ME, MS ME'70, PhD ME'74: "I completed a two-year assignment as a distinguished visiting professor at the U.S. Air Force Academy in Colorado. I am now back at the University of Nevada-Las Vegas, where I am a professor of mechanical

engineering. In 2012, I received the AIAA Energy Systems Award."

1969

John Wiesenmeyer, CE: "I've retired to the Table Rock Lake area for fishing and boating."

1970

Eric Aschinger, EE, was named a fellow of the Academy of Electrical Contracting.

Gary Johns, CE, retired Nov. 1 as vice president and manager of construction estimating with Teichert Construction after 36 years with the company.

Piloo E. Ilavia, MS PetE, sent faculty and students in petroleum engineering holiday wishes.

Jim McCaffrey, CE, is a history professor at the University of Houston-Downtown. His latest book, *Going for Broke: Japanese American Soldiers in the War Against Nazi Germany*, was recently published by the University of Oklahoma Press.

Walter Schamel III, CE: "I have retired from my second career as training manager for Airline Transport Professionals in Jacksonville, Fla."

1971

Terry W. Donze, GeoE: "My book, *Climate Realism: Alarmism Exposed*, won first prize from the Christian Choice Book Awards in the current events/political category in 2012. The book was published by Xulon Press."

Lance Wade, MinE, retired from Western Fuels-Colorado on Jan. 4, 2014.

1972

Rick Todd, ME, joined Horner & Shifrin Inc. as a project manager in environmental engineering. Based out of Springfield, Mo., he manages various water and wastewater treatment design projects and assists with marketing operations.

1973

David A. Bryan, MS Phys, PhD Phys'76: "After careers in laser and optical applications in manufacturing and aerospace, I am enjoying the freedom of setting my own schedule as a semi-retired consultant, with the business name Light Thinking LLC. If you would like to talk photons or old times, I would love

(continued on next page)

SMALL WORLD

Last September, **Max Boeh**, MinE'12 (left), was in Rolla recruiting at the Fall Career Fair. While wandering around the Havener Center during a break, looking for someone to have lunch with, he was surprised to see his brother, **Mitch Boeh**, ME'09, who was also on campus recruiting. Neither knew the other was there. Max is a tunnel connections engineer with Kiewit Underground Construction Co., based out of Chicago, and Mitch is a mechanical engineer for Abengoa in St. Louis.

PROMOTING STEM IN ARKANSAS

Photo courtesy of ML Baxley Photography

Lynda Melgarejo, EMgt'05, MS EMgt'13, was featured in the October 2013 issue of *Inviting Arkansas* magazine for her work promoting science, technology, engineering and mathematics (STEM) education. She and 11 other STEM advocates were honored at the Museum of Discovery in Little Rock, Ark., on Oct. 17. Melgarejo is the production information manufacturing engineering supervisor at Caterpillar in Little Rock.

"Education helps define better opportunities to improve our quality of life," she said in the story. "In my case, it was my engineering education that afforded me career opportunities with CAT. Knowledge in STEM areas ensures we drive technological changes that are positive and sustainable, while setting the stage for the growth of future generations."

A PASSION FOR FITNESS

Michael Wuest, Bus'07, MBA'08, is campus dining services marketing manager at the University of Missouri-Columbia and now also an owner, manager and trainer at CrossFit COMO in Columbia. He founded the gym with a friend in June 2013.

"When I came to Mizzou in 2011, I was reintroduced to CrossFit through the '300' workout (the workout the actors in the movie *300* did to get so buff). It killed me, took me forever, but I was hooked," he says. Wuest says the workout changed his life, making him more confident and improving his outlook on life. After becoming a trainer and working with others for several months, he decided to utilize his business education and open the gym.

"Since we've been open, we have touched more than 500 lives," he says. "It's been one of the most rewarding endeavors I've ever done."

Check out what else he's been up to in the "Miner Unions" section on page 34.

to hear from you at dbryan@centurytel.net."

Mark Fehlig, EE, joined the engineering team at LBA Group to support radio frequency communications and signaling interference prevention and remediation projects.

John Reiter Sr., Phys: See "Future Miners," page 41.

Stew Scott, EMgt: "On May 8, 2013, after 30 years in our home in Blue Springs, Mo., Annie and I moved to our new home in Grain Valley, Mo. An exciting time but also bittersweet. Can't believe I've been out of college 40 years! Too many great memories to count!"

(Mehmet) Nihat Taner, MS CE, lives in his hometown of Mersin, Turkey, where his wife, Bahar, is a professor at Mersin University and he is director of a manufacturing company. His company's clientele includes Nooter/Eriksen Inc. "It is always nice to find out that some of the people at Nooter were students at Rolla at the same time as I was."

Leonard Veden, CSci: "I retired as a visitor services representative from the Saint Louis Science Center in March 2013 after 16 years of enjoyable service. I am now looking for a part-time position somewhere else."

1974

Alan S. Kornacki, GGph, is working as a geochemistry consultant. He is mapping a thermal gas plume migrating through a shallow aquifer that was released when a salt solution cavity in the Napoleonville salt dome in Assumption Parish, La., collapsed last year. His results are being used to implement a gas mitigation plan that will allow the residents of a nearby community to eventually return to their homes.

Pat McCown, CE, was profiled in the Aug. 9 issue of the *Kansas City Business Journal*. He is CEO of McCownGordon Construction LLC, one of the largest commercial construction firms in the Kansas City region.

Michael J. "Boots" Miller, AE, is a retired colonel with the U.S. Air Force and is executive director of international training at the Air Education and Training Command headquarters. "Join me

ROLLA GRADS PLAY KEY ROLES IN I-70 BRIDGE CONSTRUCTION

Pictured from left: **Ken Berry**, CE'94, quality control inspector with Shalom Services; **Chris Kelly**, CE'03, quality assurance inspector with MoDOT; **Kenny Bassler**, EE'11, electrical project manager with Paynecrest; **Randy Hitt**, CE'87, bridge inspector with MoDOT; **Chris Morgan**, CE'02, quality assurance inspector with MoDOT; **Henry Woods**, CE'97, quality assurance inspector with MoDOT; **Ron Leible**, CE'87, utilities engineer with Crawford, Murphy & Tilly; **John Grana**, CE'85, resident engineer with MoDOT; **Tom Tavernaro**, CE'87, project manager with Alberici Corp., Massman Construction and Traylor Bros. Not pictured is **Jeff Church**, CE'84, deputy project director with the Illinois Department of Transportation.

A number of Rolla graduates were involved in building the new Stan Musial Veterans Memorial Bridge, which crosses the Mississippi River connecting downtown St. Louis and southwestern Illinois via Interstate Highway 70. The bridge opened to traffic on Feb. 9.

On July 26, ironworkers reached a milestone by positioning the 80-foot-long, 30,000-pound final floor beam.

According to **Randy Hitt**, CE'87, bridge project director with the Missouri Department of Transportation, a poster of Joe Miner was placed on the last piece of structural steel to celebrate the "Rolla heritage of the engineers working on the project."

"The cable-stayed bridge with a 1,500-foot main span is the third-longest in the United States," says Hitt.

in prayer for our country, that we may find and elect leaders who care more for our country than partisan principles and who will rediscover the art of negotiation and compromise. Amen!"

1977

John A. Ziegler, ME: "In 2011, I moved to St. Louis as a job transfer with Ameren Missouri with the new title career mechanical engineer. My son, Cameron, just turned 16 and attends Lutheran South. He plans to attend Rolla. My daughter, Laura, will graduate eighth grade at Christ Community Lutheran School. My wife, Brenda, is a social worker and is actively seeking employment. In the meantime, she stays active transporting kids, being a homemaker and selling Mary Kay."

1978

Kevin Bodenhamer, CE: "My wife, Mary, and I relocated back to Tulsa for the fourth time in June when I began working for Willbros Engineering as vice president and chief engineer – pipelines. In September I was elected fellow in ASME for my 20-plus years of involvement with the B31 pipeline codes and my 35-plus-year career in the gas and liquid pipeline industry."

Richard Pena, EE, joined Halliburton as a principal engineer and project manager.

Nicholas "Nick" Heatherly, CE, joined the city of Joplin, Mo., as public works director on Oct. 1.

1979

Jim Galaske, MetE: See "Miner Unions," page 33.

Rhonda (Reed) Galaske, MetE: See "Miner Unions," page 33.

Greg Wayne, EE: See update for **Kathie Rupert-Wayne**, 1986.

1980

David Schmitt, CE: See update for **Kathy Schmitt**, 1983.

1981

Jeffrey J. Heppermann, GGph: "After merging with McMoRan Oil and Gas and Freeport Copper and Gold, I am now vice president of exploration at Freeport – McMoRan Oil & Gas."

Colleen Lynch Petosa, MS GGph: "I retired from Bell Helicopter in May 2013. I am now an adjunct instructor of geology at Tarrant County College in Fort Worth, Texas. It's great to be teaching a subject that I love."

1982

Richard Allen Kottemann Jr., GeoE: "I retired from Laclede Gas Co. in St. Louis on May 1, 2013, after 31 years. I continue to work part

(continued on next page)

{ FUTURE MINERS A – E }

Chu Chow

Chung


Cochran


Driscoll


Elgmati

Seng Chu Chow, EE'88, MS EE'91, and his wife, Meifing, had a girl, LiQing, on May 17, 2013. She joins brother Son BoXuan, 11, and sister WeiQian, 9.

Steve Chung, ECE'03, MS EMgt'05, and **Kara (Mattus) Chung**, Bus'05, had a boy, Phillip Han, on June 17, 2012.

John Cochran, CerE'03, and his wife, Dana, had a boy, Judson Cole, on Aug. 23, 2013. He joins sister Jolie, 2.

Jim Driscoll, CE'07, and his wife, Kate, had a girl, Lucy Shannon, on Sept. 8, 2013.

Malek Elgmati, MS PetE'11, and his wife, Mawada Abushanb, had a girl, Rana, on Sept. 18, 2013.

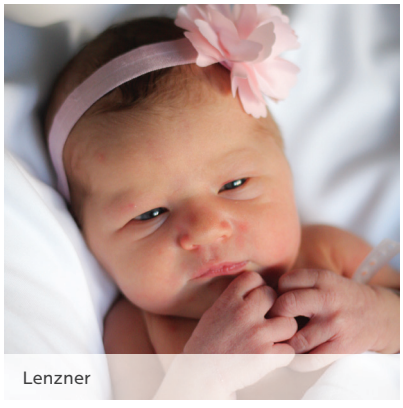
(continued on next page)


Havelka

FUTURE MINERS

H – Mc


Jordan


Lenzner


McHugh

Albert E. Havelka, ME'08, and his wife, Beth, have a 4-year-old daughter, Charley.

Robert Jordan Jr., ME'03, MS MfgE'05, and his wife, Megan, had a boy, Elliott Leo, on April 13, 2012.

Matthew Lenzner, ChE'05, and **Leah (Rechner) Lenzner**, ME'05, MS ME'07, had a girl, Zoe Kathryn, on Sept. 25, 2013. She joins brother Jack, 2.

Charles Casey McHugh, ChE'01, and **Leann (Berger) McHugh**, ChE'01, had a boy, Kian Charles, on Jan. 24, 2013. He joins brother Brogan Joseph, 5, and sister Neala Ann, 2.

(continued on page 41)

time as a consultant in the natural gas energy sector."

1983

Mark Alan Cook, CE: "I told the young engineering student that called to always be prepared for the unexpected and adapt. S&T prepares us well for that. I'm always learning new technical things. Some days I am buried with administrative paperwork, other days standing in the mud with an inspector looking at construction issues. They don't call when things are peachy. So the civil engineering journey is an adventure."

Charles "Kevin" Reed, MetE: See "Miner Unions," page 33.

Kathy Lynn (Herrmann) Schmitt, ME, MS ME'89: "We have two in college: Chris, a senior studying biochemistry at the University of Miami, and Tim, a sophomore in civil and architectural engineering at Missouri S&T. Tim is a third-generation Miner!"

1985

Aaron Miller, MinE, vice president of operations and chief operating officer for The Doe Run Co., has been appointed chair of the International Lead Association (ILA), the only global industry association focused on the safe production, use and recycling of lead.

1986

Mary (Scott) Craig, MS Chem: "I am still at Rutgers University – Camden as coordinator of undergraduate labs in the chemistry department. I recently spoke to **Terry Bone**, Chem'76, MS Chem'79, PhD Chem'90, inquiring about instrumentation in organic labs. Very helpful. Thank you. Best regards to all."

Kathie Rupert-Wayne, GGph: "I continue to work for Ottawa University in Kansas as a system administrator for our LMS system. Both kids have moved to Boston for jobs. Greg continues to work for Black & Veatch. We will celebrate our 34th wedding anniversary this year."

1988

Seng Chu Chow, EE, MS EE'91: See "Future Miners," page 37. "My daughter's name, LiQing, in Chinese means 'Love for Oak.' I named her after Oak Street in Rolla, where I lived for five years."

1989

Kevin Edwards, NucE: See update for **Suzanna Edwards**, Phys'90.

Christopher J. Frank, ME: "I'm living in Greensboro, N.C., and loving it!"

1990

Suzanna Edwards, Phys: "Two girls in college and two in high school for the fall of 2013. Kevin was called out of the Naval Reserves to active duty in Afghanistan and returned this fall. I continue to enjoy working for the Methodist church."

Tim Schroeder, ME, MS ME'94: See "Future Miners," page 41.

1993

Robert M. Wagner, ME, MS ME'94, PhD ME'99, was elected 2012–13 SAE International Fellow. He is director of the Fuels, Engines and Emission Research Center and leader of the fuels and engine research group at Oak Ridge National Laboratory.

1994

Mike Atkinson, CE, was appointed vice president for Allgeier, Martin and Associates Inc., an engineering firm with offices in Joplin, Mo., and Rolla.

Kara (Krueger) Ketcherside, EMgt: "My husband, John Christian Ketcherside, retired from the U.S. Marine Corps and we moved back to St. Louis with our 6-year-old son, Alexander."

Christopher Smith, Phys, lives with his family in O'Fallon, Mo. See "Future Miners," page 42.

1996

Kristy Yates, CE, joined the Jefferson County (Mo.) public works department as deputy director in August.

2001

Charles Casey McHugh, ChE, and **Leann (Berger) McHugh**, ChE: See "Future Miners," page 38.

Shakeel Mhaskar, MS CE, was promoted to associate at Thornton Tomasetti's Kansas City, Mo., office.

Michael Petter, CSci, joined ShipWorks in St. Louis as a senior software engineer.

Sheri (Lentz) Redfearn, MetE: See "Future Miners," page 41.

2002

Nicholas Edelman, CE, joined the city of Osage Beach, Mo., as its public works director. He and

(continued on next page)

Samuel "Bo" Mahaney
Hist'85

Samuel "Bo" Mahaney assumed command of the Air Reserve Personnel Center at Buckley Air Force Base in Colorado on Nov. 5. He was promoted to the rank of brigadier general effective Dec. 20.

Dan Greenwood
GeoE'86

Dan Greenwood joined Geotechnology Inc. as senior project manager for the firm's St. Louis Geotechnical Group.

'INVENTERN' FINALIST

Ron Erickson with Adam Savage of MythBusters. (Photo courtesy of tested.com)

Ron Erickson, IST'11, is building his own rally car from the ground up. By himself. The project got him noticed by *MythBusters* star Adam Savage, who held a contest last fall to find the next "Inventern" for his website tested.com.

Erickson made it to the final three. As part of the competition, he built a Steadicam out of found objects and a detailed replica of a coffee pot out of cardboard.

"I've been building things almost all my life," Erickson said in his contest entry video. He says many people who build racecars rely on experts to supply certain components.

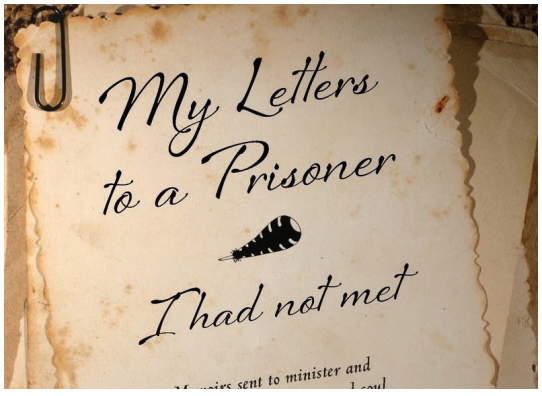
"Everybody's got a guy," Erickson says. "You've got a guy for your transmission. You know, you've got a guy that mounts your tires. I kind of threw that out the window and I said, 'I don't want anyone's help. This is my racecar. I'm taking responsibility for every piece of it.'"

Erickson bought some rough plans on the Internet, bought some steel and set to work. So far, he's built every piece of the car himself.

"I've built my skillset over the years through trial and error," he said.

Erickson and fellow rally racer **Matt Conte**, ME'10, were featured in the Summer 2012 "Hot Rods and Cool Cars" issue of *Missouri S&T Magazine*.

LETTERS OF COMPASSION AND ENCOURAGEMENT, SHARED



Take a moment to read some of the online comments at amazon.com about **Donn Ziebell**'s book *My Letters to a Prisoner — I had not met* and you'll find a small but captivated group of people who were touched, inspired and entertained by the memoir.

In the book's foreword Ziebell, MetE'57, writes that his letters to the incarcerated stranger were intended to give the man "tangible proof that someone really cares and has invested quality, personal time to communicate with him." Ziebell says that the non-fiction work details his "experiences, travel, activities and married life" and hopes it will encourage others to also write to lonely people.

Ziebell is an accomplished artist (yurart.com) who worked in manufacturing and consulting for 30 years and spent a number of years as a licensed minister in The Evangelical Free Church of America. He presented business seminars in Russia in the 1990s, which provided material for a "cross-cultural experiential dissertation" for his Ph.D. from The Union Institute University in Cincinnati, Ohio.

his wife, Karina, have a 17-year-old daughter and a 2-year-old son.

James Eidson Jr., Bus: See "Miner Unions," page 33.

Dave Redfearn, ME: See "Future Miners," page 41.

John Reiter Jr., ChE: See "Future Miners," page 41.

2003

Steve Chung, ECE, MS EMgt'05: See "Future Miners," page 37.

John Cochran, CerE: See "Future Miners," page 37.

Robert Jordan Jr., ME, MS MfgE'05: See "Future Miners," page 38.

Kelly (Reiter) Rover, EMgt: See "Future Miners," page 41.

Laura Talley, CerE: See "Future Miners," page 42.

2005

Kara (Mattus) Chung, Bus: See "Future Miners," page 37.

Matthew Lenzner, ChE, and **Leah (Rechner) Lenzner**, ME, MS ME'07: See "Future Miners," page 38.

Cameron J. Sloan, ArchE: See "Future Miners," page 41.

Josh Tesreau, ME, was promoted to area manager of maintenance for U.S. Steel's Midwest Sheet Division.

Ravindra Vohra, MS ChE: See "Future Miners," page 42.

2006

Collette Galaske, ChE: See "Miner Unions," page 33.

Andy Lozier, ME: See "Miner Unions," page 33.

2007

Jim Driscoll, CE: See "Future Miners," page 37.

Robert D. Hotz II, CE, MS CE'08: See "Miner Unions," page 33.

Michael Wuest, Bus, MBA'08: See "Miner Unions," page 34.

2008

Albert E. Havelka, ME, recently celebrated his fifth anniversary with Caterpillar Inc. He enjoys spending time with friends and family and tinkering with his gun collection. His 4-year-old likes to learn how things work. Check out "Future Miners," page 38.

Gavin N. Risley, EnvE, MS EnvE'10, is a licensed professional engineer

James "Buck" Hawkins
MinE'10, MS ExpE'10

James "Buck" Hawkins, a member of the Kentucky National Guard, was named command sergeant major for the 103rd Chemical Battalion in Richmond, Ky. He lives in Solon, Ohio, where he is director of education for the International Society of Explosives Engineers. He and his wife, Amy, have four children.

Mike Wodicker
ChE'03

Mike Wodicker joined EPIC Systems Inc. as a project manager in St. Louis.

and certified floodplain manager for the state of Illinois. He is a staff engineer in the water resources department at Klingner and Associates P.C.

Emily (Speorl) Sloan, Chem: See "Future Miners," at right.

2009

Clint Galaske, ME: See "Miner Unions," page 33.

Tyler Johnson, BioS, Hist: See "Miner Unions," page 33.

Jennifer (Province) Turner, Bus, Econ: See "Miner Unions," page 34, and "Future Miners," page 42.

2010

Kirsten (Luer) Garrabrant, EE: See "Miner Unions," page 33.

Maxwell "Tobias" Tupper, GGph, and **Amber (Loftis) Tupper**, ChE, were married on July 16, 2011. See "Future Miners," page 42.

Warner Meeks, AE, MS AE'12: See "Future Miners," at right.

2011

Ryan Cox, GGph: See "Miner Unions," page 33.

Malek Elgmati, MS PetE: See "Future Miners," page 37.

Daoru Han, MS AE, was the president of the Chinese Students and Scholars Association and is currently completing his Ph.D. at the University of California. He says he misses Rolla while he's living in Los Angeles.

Nikolas Moesch, ME: See "Miner Unions," page 34.

Matthew Turner, MinE: See "Miner Unions," page 34, and "Future Miners," page 42.

2012

Jamie Meeks, Hist: See "Future Miners," at right.

2013

Paige (Vessell) Moesch, EMgt: See "Miner Unions," page 34. ■

{ FUTURE MINERS }

M - Sl

Meeks

Redfearn

Reiter

Schroeder

Sloan

Warner Meeks, AE'10, MS AE'12, and **Jamie Meeks**, Hist'12, had a girl, Lana May, on May 3, 2012. She was born one day before her mom graduated.

Dave Redfearn, ME'02, and **Sheri (Lentz) Redfearn**, MetE'01, had a girl, Eden Hope, on Sept. 24, 2013. She joins brothers Josiah, 8, Elijah, 6, and Ezra, 2, and sister Moriah, 4.

John Reiter Jr., ChE'02, and his wife, Marci, had a boy, John III, on Jan. 14, 2013. He joins sister Alyson, 3. Relatives include grandfather **John Reiter Sr.**, Phys'73, and aunt **Kelly (Reiter) Rover**, EMgt'03.

Tim Schroeder, ME'90, MS ME'94, and his wife, Faith, had a boy, Ethan, on July 19, 2012.

Cameron J. Sloan, ArchE'05, and **Emily (Speorl) Sloan**, Chem'08, had a girl, Ella Songkum, on April 5, 2013.

Smith

FUTURE MINERS

Sm - Z

Talley

Tupper

Turner

Vohra

Christopher Smith, Phys'94, and his wife, Pam, had a girl, Mackenzie Ann, on April 10, 2013. She joins sister Zoey.

Laura Talley, CerE'03, and her wife, Amber Roberts, had a boy, Connor James Roberts, on Feb. 26, 2013.

Maxwell "Tobias" Tupper, GGph'10, and **Amber (Loftis) Tupper**, ChE'10, had a boy, Owen Ansel, on May 13, 2013.

Matthew Turner, MinE'11, and **Jennifer (Province) Turner**, Bus'09, Econ'09, had a girl, Briley Ruth, on March 29, 2012.

Ravindra Vohra, MS ChE'05, and his wife, Peena, had a boy, Vikrant, on Sept. 8, 2012. He joins brother Neel, 4. ■

MINERS **REMEMBERED**

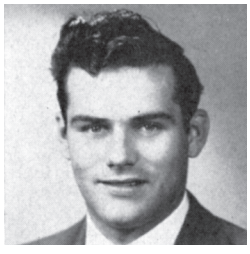
Missouri S&T Magazine *will announce deaths when information is submitted by an immediate family member or published in a newspaper obituary. Notification of deaths that have occurred more than two years before the date of publication will not be published unless a special request is made by a family member. Yearbook photos, if available, will be included for alumni when families submit obituary information.*

John W. "Jack" Gardner II
MinE'41

John W. "Jack" Gardner II was a member of Sigma Nu fraternity and served as a lieutenant commander in the U.S. Navy during World War II. He retired from Gardner Denver. He enjoyed duck hunting and was a member of Ducks Unlimited. (Aug. 5, 2012)

George V. Bradshaw Jr.
ME'42

George Bradshaw Jr. participated in Blue Key and on the *Rollamo* staff. He retired from Verizon. (Oct. 10, 2013)

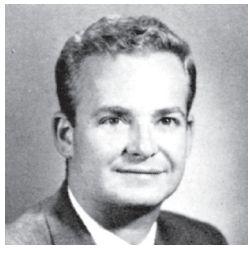


John L. White
MinE'48

John L. White retired in 1976 as city engineer and public works director in Dubuque, Iowa. He continued work as a consulting engineer and land surveyor until his death. A registered professional engineer in Iowa, Wisconsin and Illinois, he received numerous awards for civic service and volunteerism. (July 12, 2013)

Chris A. Wunnenberg Jr.
ME'48

Chris A. Wunnenberg Jr. served as a B-17 pilot in the U.S. Army Air Corps. He retired as vice president of engineering for National Distillers (now Quantum Chemical Corp.) in Cincinnati in 1988. (Jan. 26, 2013)



Hal G. Gallimore
MinE'50

Hal G. Gallimore received several awards for his service in the U.S. Army during World War II, including a Purple Heart. He joined his father-in-law's plumbing business, eventually running the company with his brother-in-law, and retired from contracting at the age of 82. (June 25, 2012)

1942

John D. Nicholson Sr., MinE (Aug. 28, 2013)

1943

Joseph P. Berndt Jr., ChE (April 16, 2012)

John V. Driscoll, ChE (Nov. 15, 2012)

Frederick J. Radd, MetE (Oct. 16, 2013)

John C. Schilling, ChE (July 19, 2013)

1944

P. Gene Smith, EE (Aug. 13, 2013)

1945

Robert F. "Bob" Schmidt, MetE (May 30, 2013)

1947

Glenn H. Fritz, MinE (Aug. 5, 2013)

1948

George E. Gregg, ME (August 2012)

Paul E. Hoey, CerE (Oct. 15, 2013)

Donald G. Lowder, ChE (June 23, 2013)

Homer T. Sheppard, MetE (Aug. 3, 2013)

1949

William H. "Bill" Magruder, MetE (Sept. 7, 2013)

Willis E. Mann, EE (Jan. 3, 2013)

Therold W. Perkins, ME'49 (May 2, 2013)

Joseph S. Quinn, MinE (Oct. 15, 2013)

1950

Sheldon I. Arenberg, Phys (Aug. 6, 2013)

Robert Lee Aston, MinE, MS GeoE'92, DE GeoE'00 (Sept. 1, 2013)

Roger A. Brooks, ME (January 2013)

Arthur M. Krause, PetE, MS PetE'51 (Dec. 28, 2012)

Harry C. Lohman, ChE (Sept. 19, 2013)

Charles M. "Chuck" Rice, MS Phys (Sept. 2, 2013)

Richard E. Schwab, CE (Feb. 5, 2013)

Harold F. Weisenstein, ME (Oct. 5, 2013)

1953

Howard J. Yorston, GGph, MS GGph'54 (Aug. 18, 2013)

John C. Young, CerE (July 22, 2013)

1954

Paul L. Grandcolas, PetE (Oct. 23, 2013)

1955

Thomas J. Allen, MinE (Sept. 29, 2013)

1957

Robert C. Lange, PetE (2012)

1958

Gary R. Dally, EE (July 26, 2012)

1960

Charlie L. Blalock, CE (May 7, 2013)

Clyde M. Rea, EE (Sept. 23, 2013)

1961

Thomas K. Bohley, EE, MS EE'66 (Aug. 6, 2013)

Gary M. Broyles, NDD (Oct. 25, 2013)

Willis D. Lawler, EE (Jan. 7, 2013)

Charles F. Marosek III, MinE, MS CE'63 (Oct. 5, 2013)

1962

Wayne O. Bales, ME (Oct. 28, 2012)

Larry L. Eaton, EE (Nov. 13, 2011)

Robert W. Hecht, ME (Oct. 8, 2013)

1963

Shirley M. Schmidt, Chem (July 7, 2013)

1964

Rohit P. Sheth, ChE, MS ChE'66 (March 13, 2012)

1966

Richard T. Fisher, EE (December 2012)

William B. Stratton, ChE (June 16, 2013)

William J. "Bill" Surdakowski, EE (Sept. 12, 2013)

1967

John B. Copp, ME (Oct. 15, 2012)

1968

Ronald F. Zauner, ME (March 27, 2013)

1970

Rodney G. Bullinger, ME (Aug. 16, 2013)

Ronald J. Sartain, ME (May 22, 2013)

1971

Billy E. Bennett, MS Tch Chem (July 11, 2013)

Ronald R. Primmer, MS EMgt (Sept. 24, 2013)

1972

Frederick L. Kocher, MS EMgt (July 15, 2012)

1973

Paul L. "Spark" Jarboe Jr., MS CSci (Sept. 23, 2013)

Rodney E. Lough, EMgt (July 21, 2013)

Bennett D. Howell
ME'50

Bennett D. Howell was shot down in Germany while flying for the U.S. Army Air Corps during World War II. A prisoner of war, he received a Purple Heart. He worked for the Public Service of Oklahoma for 27 years. In 1977, he became owner, president and CEO of Wellhead Compression Inc., retiring in 1988. (Jan. 29, 2013)

George K. McFall
MetE'50

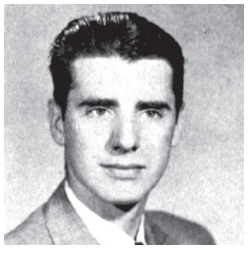
George K. McFall was a B-17 pilot for the U.S. Army Air Corps during World War II, stationed in England. His plane was shot down and he was a prisoner of war for 13 months. Following graduation, he worked as a metallurgist for 34 years in Platteville, Wis., while helping raise six children with his wife. (May 29, 2013)

Richard E. Zumsteg
MinE'51

Richard E. Zumsteg was involved in intramurals and was a member of Kappa Alpha Order and the Army ROTC. He retired from DuPont after serving 34 years with the company. (Aug. 14, 2012)

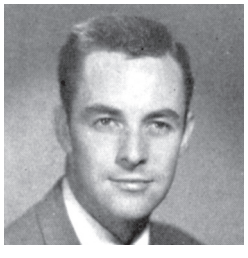
John W. Finklang
GGph'52, MS EMgt'71

John W. Finklang served in the U.S. Army Signal Corps during the Korean War and worked for Anaconda Copper Co. and the Montana Bureau of Land Management. A government observer with the 1960 Falkland Island Dependencies Survey in Antarctica, he retired from the Defense Mapping Agency in 1985. (July 25, 2013)



Wallace H. Holmes
MinE'52

Wallace H. Holmes was a member of Phi Kappa Phi honor society and served in World War II. He retired from the Florida Department of Transportation as mass transit engineer in 1990. (April 6, 2013)

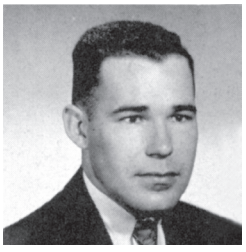


Gregory V. Menke
CE'52

Gregory V. Menke served in the U.S. Army during World War II in the occupation of Japan. He was a member of Phi Kappa Theta fraternity and retired from Granite City Steel as superintendent of the blast furnace and primary operations in 1993. (April 23, 2012)

Clarence E. Richey
ME'52

Clarence E. Richey was a member of the Independents, choir, orchestra, Student Council and the Baptist Student Union while a student. He retired from Manville Corp. (Sept. 1, 2012)



Robert W. "Bob" Cowan Jr.
PetE'57

Robert W. "Bob" Cowan Jr. was a member of Tau Kappa Epsilon fraternity and edited the *Missouri Miner*. He earned a master's degree and an MBA, organized the first national resources loan department at The First National Bank of Denver and started his own oil production company. (July 29, 2013)

Robert O. "Bob" Capps
PetE'58

Robert O. "Bob" Capps was a member of the Independents, Baptist Student Union and Army ROTC. He spent four years with Conoco, then 37 years with State Farm Insurance in Texas, retiring in 2000. He held many community leadership roles and spent four years in mission work with his wife in Australia. (Aug. 18, 2013)

1974

Delbert L. "Mr. Fraggle" Teel II, ME (Oct. 10, 2013)

1979

S. John Calise, CE, MS CE'81 (July 19, 2013)

Mark A. Kincy, ME, MS ME'81 (Aug. 9, 2013)

Mark A. Winnett, ME (Aug. 18, 2013)

1985

David O. Strickland Jr., ME (Sept. 24, 2013)

1988

Jian-Lin "Frank" Liu, PhD Chem (June 18, 2013)

1994

Glen David Graham, CE (June 27, 2013)

1999

Joseph Z. Fan, ME (Jan. 24, 2013)

2008

Theodore T. Freeman, SysE, MS SysE'09 (July 15, 2013) ■

CHARLES R. "CHUCK" REMINGTON

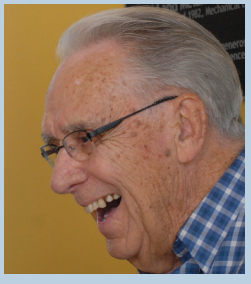
Charles R. "Chuck" Remington, ME'49, MS ME'50, professor emeritus of mechanical engineering, died on Nov. 28, 2013.

Following service in the U.S. Army during World War II, he returned to school to complete his studies and ended up making Rolla his home with his late wife, Agnes.

Mr. Remington taught and advised thousands of students and was instrumental in starting a student chapter of the Society of Automotive Engineers and Kappa Kappa Psi, the national honorary band fraternity. He advised several student organizations and was active in and recognized by many professional organizations.

He was named an assistant professor of mechanical engineering in 1954, associate professor in 1957 and professor in 1961. He served as director of the co-op program from 1978 to 1982 and director of the career development office from 1982 until his retirement in 1989. He remained active on campus volunteering for the Miner Alumni Association and attending alumni events.

Mr. Remington was co-founder and served as the first president of the Rolla Optimist Club, where he was a member for more than 50 years.



DR. DANIEL R. WHITE

Dr. **Daniel R. White**, Phys'62, MS Phys'64, PhD Phys'70, died on July 1, 2013. He served in the U.S. Army from 1967 to 1969, achieving the rank of captain before joining the faculty in Rolla, where he conducted cloud physics research and taught engineering mechanics. Dr. White helped design Rolla's first cloud chamber, which simulated atmospheric events in the laboratory and was the foundation for the Missouri S&T Center of Excellence for Aerospace Particulate Emissions Reduction Research. He retired as a professor emeritus in 2005.

DR. JAMES W. "JIM" JOINER

Dr. **James W. "Jim" Joiner**, MS Math'62, retired associate professor emeritus of mathematics, died on Nov. 26, 2013, following an extended illness. He earned a Ph.D. from Peabody University in Nashville, Tenn., and taught mathematics at S&T from 1959 to 1997. He had a special affinity for South American students and went out of his way to help them feel welcome on campus. He and his wife visited their home countries several times. Dr. Joiner was active in his church and in the Rolla Optimist Club.

Floyd E. Roberson
EE'58

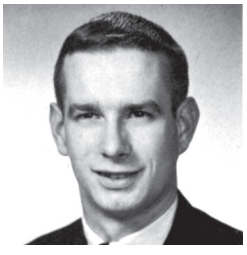
Floyd E. Roberson worked for the Federal Aviation Administration in Alaska, Missouri and Colorado. After his retirement in 1981, he sold real estate, was an auctioneer, owned an R.V. park, served as mayor of Riverside, Wyo., and was a member of the Lions Club for 50 years. (Sept. 18, 2013)

Thomas A. Hamilton
ME'64

Thomas A. Hamilton was a member of many organizations as a student, including Delta Sigma Phi fraternity. He spent his career at the Naval Weapons Center in China Lake, Calif., where he received several awards including the Navy Meritorious Civilian Service Award and the Technical Director's Award. (July 19, 2013)

George H. Carr
ME'65

George H. Carr was a member of the Independents, Student Council and the Student Union Board. He owned and operated Carr Engineering Services LLC in Bonne Terre, Mo., for more than 25 years. (March 15, 2013)



Daniel K. Goodman
EE'65

Daniel K. Goodman was a member of Pi Kappa Alpha. He earned a master's degree from Stanford University and a Ph.D. from the University of New South Wales. He returned to Rolla to teach electrical engineering from 1971 to 1974, then taught at Purdue Calumet University and later at Valparaiso University. (July 6, 2012)

FRIENDS

Howard E. Adair (Oct. 26, 2013)

Frank E. "Bud" Beechner Sr. (Oct. 29, 2013)

Earline Belisle (April 16, 2013)

Wendell B. Bishop (Sept. 25, 2013)

William B. Brown (Aug. 24, 2013)

Leo L. Christopher (Oct. 7, 2013)

Beverley J. Clark (July 9, 2013)

Alice M. Clift (July 3, 2013)

Charley Eugene "Gene" Hart, retired HVAC technician at S&T (Oct. 1, 2013)

Jeremy Hinkemeyer (Sept. 27, 2013)

Heath Cruts Ice (Aug. 1, 2013)

Lois Jaquess, former administrative assistant in business and information technology at S&T (Oct. 25, 2013)

Joan Kemper, wife of Robert J. Kemper, CE'49 (Aug. 6, 2013)

Grant Lemasters (Aug. 17, 2013)

Roger J. Lueckenhoff (Aug. 11, 2013)

James W. Mauck (Sept. 5, 2013)

Joanne Mayberry (Oct. 28, 2013)

Louise Metzner, wife of John Metzner (Aug. 21, 2013)

Lyla MonPere (April 24, 2013)

Charles Otis (Sept. 1, 2013)

Jon A. Crabtree
CE'66

Jon A. Crabtree worked at Caterpillar Inc. for 32 years before retiring in 1998. During retirement he enjoyed spending time with family and playing golf, fishing and tennis. (June 21, 2013)

Louis B. "Lou" Goldfeder
ME'67

Louis B. "Lou" Goldfeder was a member of Sigma Nu fraternity and founded and owned Key Controls Inc. A member of Congregation Schaarai Zedek, the Holocaust Museum, the Tampa (Fla.) Jewish Federation and the Jewish National Fund, he received the Tree of Life, Guardian of Israel Award in 2012. (Sept. 18, 2012)

Kim F. "Mac" McGinnis
ME'79

Kim F. "Mac" McGinnis was a member of the St. Pat's Board and faithfully attended St. Pat's celebrations in Rolla since graduation. He was a member of the Tech Engine Club, the Independents and played rugby while a student. He worked for Reyco-Granning in Springfield, Mo., for the last 15 years. (Sept. 7, 2013)

Theresa D. (Talty) Stone
GeoE'80, MS GeoE'87

Theresa D. (Talty) Stone worked for Tenneco for several years before coming to Rolla. After graduation, she worked for Waste Management Inc. as a hydrogeologist, site engineer and project manager. (Feb. 20, 2013)

Geraldine Pendleton (Sept. 12, 2013)

Mark Rolufs, husband of Angie Rolufs, EMgt'84, director of the office of sustainable energy and environmental engagement at S&T (Nov. 29, 2013)

Jeannette Schneider, wife of the late Norman F. Schneider, ME'50 (May 15, 2013)

William Seay (January 2013)

Louise Shockley, wife of the late Gilbert R. Shockley, ChE'42 (Oct. 21, 2012)

Lonnie T. "Dale" Shetler (Sept. 13, 2013)

Stan Spadoni (Aug. 26, 2013)

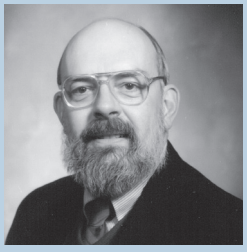
Wilma L. Turner, former lecturer in public speaking and communication at S&T (Sept. 25, 2013)

Albert Walker (Aug. 28, 2013)

Alex Wiggs (Aug. 26, 2013)

John H. Williams (May 1, 2013)

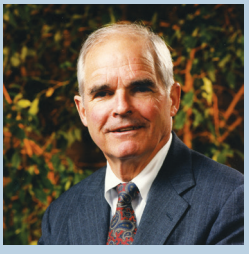
Barbara Ellen Wilson, retired bookkeeper at S&T (July 9, 2013)



DR. JAMES N. WISE

Dr. **James N. Wise**, professor emeritus of English and technical communication, died on Oct. 29, 2013. He earned a bachelor's degree in journalism and a master's degree in English from West Virginia University, and a Ph.D. in English from the University of Florida in 1964.

Dr. Wise joined the faculty at S&T as an associate professor of English in 1967. He taught literature and writing until his retirement in 2008. He served as chair of the humanities and English department from 1981 to 1990, and in 1998 was named the Rolla coordinator of a dual enrollment program with the University of Missouri-St. Louis that would offer a master's degree in English. His book, *Sir Thomas Browne's 'Religio Medici' and Two Seventeenth-Century Critics*, was published in 1973.

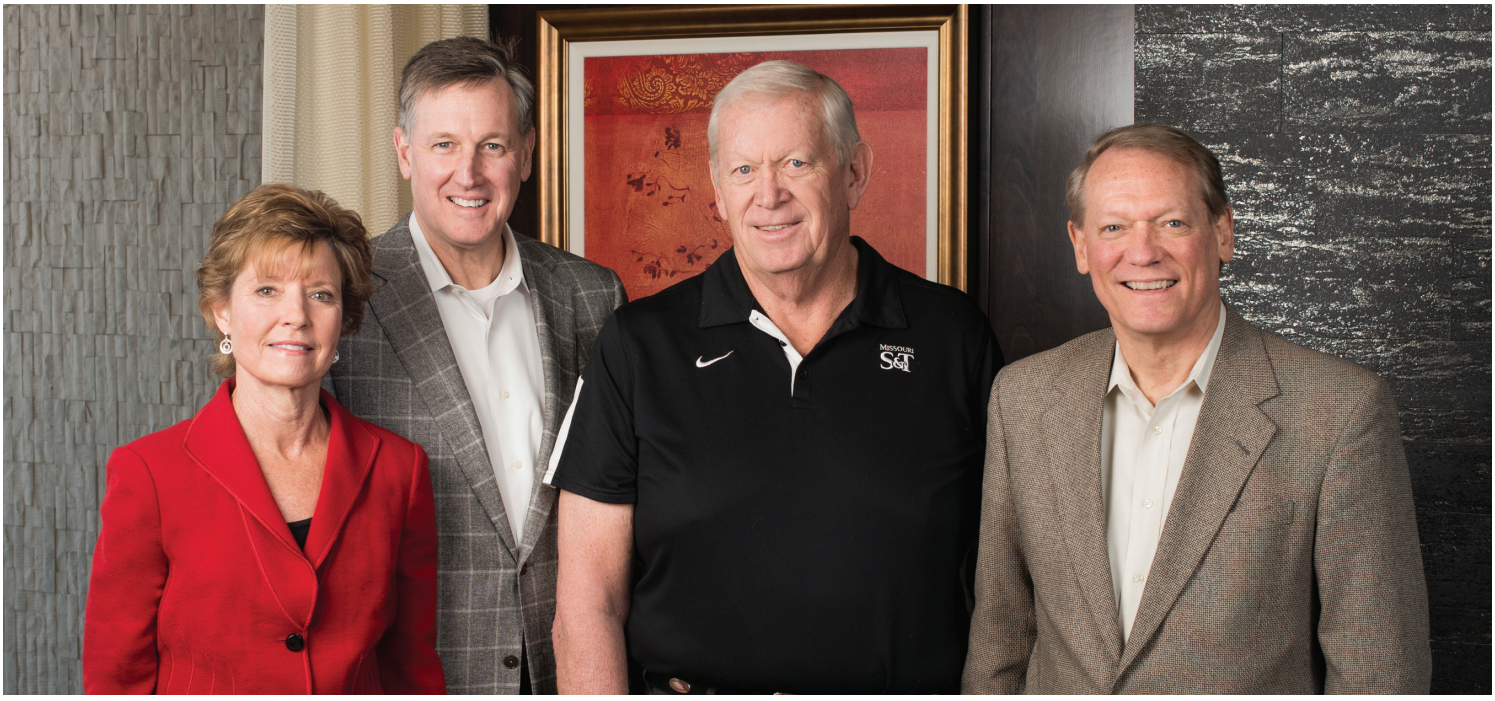


ROBERT H. QUENON

Robert H. Quenon died on Nov. 19, 2013. He was instrumental in establishing the first endowed chair at S&T in 1993, the Robert H. Quenon Chair of Mining Engineering. Mr. Quenon retired as CEO of Peabody Holding Co. in 1991, after a long and distinguished career in the coal industry. He received the American Institute of Mining, Metallurgical and Petroleum Engineers Erskine Ramsay Medal in 1985, and the National Coal Association's Distinguished Service Award in 1991.

TULSA ALUMNI MATCH FUNDS FOR FIELD IMPROVEMENTS:

TULSA TURF TEAM



Kristie and John Gibson, Keith Bailey and Steve Malcolm are four of the six members of the Tulsa Turf Team who are providing a 1-to-1 match to help fund the installation of turf on campus. (Photo by Rick Ayre/Oneok Inc.)

Love it or hate it, artificial turf has many benefits — including year-round field use and an even playing surface. In October, students voted to fund 75 percent of the $2.4 million required to install turf on S&T's football and intramural fields, but more is needed.

Three couples who have helped fund other Miner athletic improvements are doing it again, and hope others will join the effort. **Keith**, ME'64, and **Pat Bailey**, **Steve**, CE'70, and **Gwen Malcolm**, and **Kristie**, EMgt'74, and **John**, EMgt'74, **Gibson** have created the $150,000 Tulsa Turf Team Challenge, which provides a 1-to-1 match to reach a goal of $300,000 in private donations.

"Tulsa is a close-knit business community," says Bailey. "We have a great personal friendship, in addition to a business relationship." Bailey and Malcolm are both retired CEOs from Williams and John Gibson is non-executive chair of ONEOK Inc., ONEOK Partners LP and ONE Gas Inc.

"I was convinced that this was worthwhile because of the students' commitment to help fund it," says Bailey. "They'll end up with two fields that will benefit the entire student body. It will give the school a lot more functionality."

The intramural field near the Gale Bullman Multi-Purpose Building was torn up to make way for the campus's geothermal energy project, and rather than reseed the field, students voted to use their activity fees for the turf project. Another $300,000 in reinvestment funds from the geothermal project also went toward turf installation. The remainder will be raised by donors led by the Tulsa Turf Team.

"Kristie and I appreciate that this also benefits intramurals," says Gibson. "Although I was fortunate to participate in intercollegiate athletics, I remember how important intramurals were to many other students." While at Rolla, Gibson played basketball and Bailey played football and basketball.

Both fields will be striped for football and soccer. The intramural field is scheduled for completion this summer and the stadium turf will be ready for the football home opener on Sept. 20.

"I hope this will jog some others' memories of when they were students — how much they enjoyed participating in athletics," says Gibson.

The deadline to participate in the $150,000 Tulsa Turf Team Challenge is June 30. For more information, contact **John Held**, executive director of development, at 573-341-6533. ■

3-D PRINTING

Missouri S&T's 3-D printer, housed in Curtis Laws Wilson Library, lets students create complex shapes like this scale model of the Formula SAE car using layers of plastic filament. The full-size Formula car will compete in Formula SAE Michigan in May. It's just one of many S&T design teams that compete every spring. Watch **design.mst.edu** for competition results or follow **experiencethis.mst.edu** for updates.

MISSOURI S&T

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Rolla, MO 65409-0650

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Parents: If this issue of Missouri S&T Magazine *is addressed to your son or daughter who has established a separate permanent address, please notify us of the new address: 573-341-4145 or alumni@mst.edu.*

UNDER CONSTRUCTION

Construction of the Hasselmann Alumni House, located at 1100 N. Pine St., has begun. Wright Construction Services Inc., the contractor for the building project, plans for the Miner Alumni Association to move into the new building late in 2014. We'll host an official dedication during St. Pat's in 2015, but you can watch the progress live at **mineralumni.com/house**.

As you see the building go up, though, please remember that fundraising for this project continues. Approximately $1.5 million in naming opportunities are still available. The Koeppel Challenge, which offers $1 in matching funding for every $2 contributed, is still available for gifts of $25,000 or more.

For more information, contact Darlene Ramsay, executive director of alumni relations and advancement services, at ramsayd@mst.edu or 573-341-4145.

WATCH IT LIVE AT MINERALUMNI.COM/HOUSE